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EXPERIMENTS

L N

AGRICULTURE,

Made under the DIRECTION of

The RIGHT HONORABLE and HONORABLE

DUBLIN SOCIETY,

In the Year 1766.

And now Published at Their Request.

By MR. JOHN WYNN BAKER.

" Men of Sense live exempt from vulgar Awe,

" And Reason to herself alone is Law." CHURCHILL.

D U B L I N :

Printed by S. POWELL, for the AUTHOR.

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T O

The RIGHT HONORABLE and HONORABLE
DUBLIN SOCIETY,

T H I S

R E P O R T

O F

EXPERIMENTS in AGRICULTURE,
IS GRATEFULLY INSCRIBED,

By their most Obliged
And most Devoted,

Humble Servant,

JOHN WYNN BAKER.

LAUGHLINSTOWN,
April 22, 1767.

P R E F A C E.

To THE CANDID READER.

In my former Reports, I did not enter into a description, how the Instruments for the Drill Husbandry are to be used in the different Operations, which are the Basis of that Culture; because the Experiments had not continued long enough to determine, whether Mr. *Tull* was mistaken in his System, or those who oppose and condemn it; for no other Reason, I have been willing to hope, than because they know nothing of the Matter.

In the following Sheets, I have the Pleasure to say, the Opponents will appear to have been mistaken, and Mr. *Tull's* System will be found to have supported itself in *Practice*, at least for *three Years*: And therefore, I have now given the Reader a short Account how to use the Instruments, for obtaining a Succession of Crops in that Culture; which Advantage arises from the Effects of the Instruments, and which Effects I have endeavoured to explain in a familiar and concise Manner.

The Principles upon which the Drill Husbandry is built, I have not entered upon, because these Publications being calculated for the Recital of Experiments only, the Nature of them is too circumscribed to enter upon first Principles; and indeed, until it shall be shewn by Exhibitions in the Field for some Time, that it can, at considerably less Expence, be reduced to Practice with great Simplicity, and afford much larger Profits to the Farmer, than the Common Husbandry, it would be anticipating the Matter to offer Principles, before we shall confirm the Practice, by a long and continued series of Experiments

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ments, and therefore, in the following Sheets, I have confined myself to the latter only.

That some People yet remain doubtful of the superior Advantages of this Culture, must be admitted (the old peevish Assertion of its impracticability I hope is exploded) but that Doubt arises not from their Practice, at least, not from a well executed Practice, or even from an unprejudiced View of it in the Field; because I have the Pleasure to know, that all candid Persons of every Degree, receive the fullest Conviction upon seeing the Crops; of which, it is no inconsiderable Proof I think, that many Gentlemen and Farmers in different Parts of the Kingdom have already adopted it, without any other Invitation, than that of seeing my Exhibitions in the Field; for I never yet recommended it to any Man to enter into this Culture, but on the contrary have dissuaded many from it, from Causes, which in my Mind, were sufficient Bars to their Success. Many of the Persons who have adopted it, can testify, that I have upon all Occasions, personally and by letter, described the common Impediments, which come in the Forms, of improper Ground being chosen, insufficient Tillage, Negligence of the Master, Disobedience and Obsturacy of Servants. I presume these are Impediments which would obstruct the Progress and Success of any kind of Business, and therefore, why the Drill Husbandry should be expected to stand against them, I can't imagine.

That Mr. *Tull* himself was treated with unjust severity, by a set of ignorant People, is well known to every Man who has read his whole Works, and the other Publications of his Time; but sound Reasoning had no Part in the Arguments used against him and his System. Insolent Abuse, and notorious Falshoods, were the only Engines employed to disgrace him. As a Proof of which, his Works now live, and obtain a respectable Place in the Libraries of Philosophical Learning, whilst the Papers of his Opponents are consumed in the meanest Offices.

When

When misrépresentations were levelled against this great Man, (for great I consider him,) it is the less to be wondered at, that I, one of his Followers, should meet with the like Abuses; because, as Mr. *Tull* himself says, "There is no guarding against lying Tongues," for a Knave will assert a Falshood with as much Confidence, as an honest Man will propagate a Truth.

When my Drilled Wheat, of last Year, (which in Part, is the Subject of the following Sheets, being the third Drilled Crop in succession upon the same Ground,) made a Figure, which gave the highest Satisfaction to every one who saw it: it was admitted even by a Person who came to view it, (with an Intention, as appeared by the sequel, of depreciating what in his Conscience he could not but approve) to be a very fine Crop. This was a Point gained, because to obtain a good Crop in this Way has by many been considered as impracticable; but he propagated a Story, that I had, to his Knowledge, very highly manured the Ground under the Drilled Corn, but that I had not manured that under the Common Husbandry at all. Now it happens, that the Field in which these two Species of Culture were comparatively depending, was manured for Drilled Turnips, as will appear in my Report for the Year 1764, and as many Gentlemen saw and can testify; and was intended, after the Turnips, for another Species of Plant (Lucerne) under the Horse-Hoing Husbandry; but the Order of the Society, of the 25th of July, 1765, * obliged me to devote two Acres of this Field to the comparative Culture of Wheat; and therefore I sowed the Remainder under the same Grain in Drills, except about half an Acre, which I transplanted with Lucerne. The Appearance of the Wheat; under the Common Husbandry, when growing, and the Produce, † fixes an Appellation upon this Person, which every Man should be ashamed of being stigmatized with.

The same Person came again this Year, in upon the back Part of my Farm, secretly and privately, being

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* See the first Page of the following Sheets.

† See Page 13.

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ing conscious I suppose, that he could not with any Decency shew his Face, as every well-intentioned Man should do, and fixed his Inspection upon a Part of the Land, which is now under the second Crop of Drilled Wheat, in very poor Ground; calculated to see how far the Horse-Hoe would answer as a Substitute for Manure, and general Fallow in such a Soil; and altho' he was seen by some of my People, and informed, that if he would go to the other Side of the Hill, there he would find as fine Corn, under the same Culture, as any he had seen; yet he avoided that for Reasons best known to himself. This Inspection was made in the Month of *March*, when the Corn, in such poor Ground, could make no extraordinary Figure. From this Kind of View, this Person immediately propagated a Story, that my Drilled Corn in general was very bad, and that there were several Places, for Yards together, in which there was no Corn at all. But the Falshood of this Representation has been often confuted since, by the Inspection of Gentlemen of the first Rank; some indeed, were kind enough to come from Dublin on Purpose, at my particular Request.

I hope the Reader will pardon my troubling him with this Relation, because I do it with an Hope, that whoever shall hear such Stories as these, will take an Opportunity of examining with their own Eyes, and thereby form a Judgment from their own Understanding; and not rely upon the Representations of People, who are capable of descending into such Meanness, to degrade a System, which, either from want of Judgment, or Candor, or perhaps both, they cannot or will not understand.

It has been truly said, by an ingenious modern Writer, whom I have the Happiness to call my Friend, that "Envy repines at Excellency, without Imitation, " and like a fore Eye fixed on Merit, is offended at "every Thing that is Bright." Hence it is, that the *Tullonian* Culture has so many pratling Degraders to contend with; but the judicious Practisers of it have this Consolation, that in whatever Form the Opponents of it, who would be thought *most wise*, do ap-

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pear, Falshood is their principle Strength. And those who believe not in it, because they *confessedly* do not understand it, *Moderation will excuse.*

It has been insinuated (as I am informed) by a Person who has never seen my Farm or my Factory, and consequently cannot be a competent judge of what I am doing, or what I have done; that I have "*not introduced any Thing that is new.*" I shall submit that Point to the Judgment of such Persons, as have given themselves the trouble to examine into what I have done, towards a general Improvement of Agriculture in this Kingdom; for it is hard upon a Man of any *Feelings*, to represent on his own Behalf, what he has done in any Undertaking, in which he may be engaged; because the representation should appear in that *Equity*, which every diligent, faithful Man, is intitled to from the Publick; and it is with *gratitude* to that Publick, that I own I am truly conscious, my Name has met with *that Favor*, from all judicious, candid, and real Friends to Agriculture, who have been here to examine my Labors; which I think, we cannot have a much greater Proof of, than the Demand for my Instruments of Husbandry, since the Commencement of my Factory, which amounts to about sixteen hundred Pounds; not much more than half of which are finished, altho' I have upwards of twenty Artificers employed. But I shall return to the Charge, and leave the Reader to judge whether this Undertaking *alone*, is, or is not of Consequence to the Kingdom.

Not to trouble the Reader with an Account of *all that I have done*, I shall only say, that I have reduced to Practice in this Kingdom, a System of Agriculture, which has been thought in a Manner impracticable, from the many bungling Attempts in it. I have introduced, and do now manufacture *intelligible* Instruments, for the Execution of that Husbandry, and have *instructed some of the Natives* in the compleat Use of those Instruments: Points, which the *Dublin Society*, ineffectually attempted to obtain thirty-six Years ago, as will appear from the *Date* of the following Letter to *Mr. Tull,*

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Mr. *Tull*, abstracted from his Supplement to his Horse-Hoing Husbandry, Page 244, 2d Edit.

“ SIR,”

“ THERE is just now a Society formed of near
 “ two Hundred of the chief Gentlemen of the
 “ Kingdom for the Improvement of Husbandry and
 “ Manufactures, but principally the first, in Order
 “ to introduce the best Method of Tillage and
 “ improving Land; and as you have been so great
 “ a Benefactor to the Public by the *Specimen* you
 “ have published; one of which I had from you last
 “ June, when I went to wait on you, and at the same
 “ Time so obliging to walk and shew me the *Proof* of
 “ your Method; which, as well as I could remember,
 “ I related to the Society; and had several of your
 “ Specimens reprinted here, which has raised a Desire
 “ in every Body that reads it, to see the Treatise at
 “ large, with the several Plans of the Tools; this alone
 “ will not be sufficient without a Person be sent over
 “ that will shew the Use of them, who would meet
 “ with due Encouragement.

“ I am now desired by this Society to write to you,
 “ to have your consent to enter your Name amongst us,
 “ and to beg the Favour of your Assistance, to com-
 “ municate your Thoughts on the Subject we are en-
 “ gaged in. The Earl of *Halifax* has done us this
 “ Favour. The chief Benefit proposed is to promote
 “ your good Work among all the Farmers of this
 “ Kingdom, which is by Nature very well adapted to
 “ all Kinds of Tillage, having all Kinds of Soils you
 “ have in England, except the Chalk, of which here
 “ is none. You had a Servant, when I was last to
 “ wait on you, that did understand your Method of
 “ Tillage: If you can spare him, which I understood
 “ by you, would be convenient about this Time, he
 “ shall have what Wages you think he deserves; and
 “ he may at the same Time, bring over with him an
 “ entire Set of Tools.

“ I Desire

“ I Desire the Favour of your Answer as soon as
“ possible, directed to me at the Parliament House
“ here, and you will much Oblige,

Sir,

Your Most Obedient,

Humble Servant,

Dublin,
March 4th, 1731.

G. M.

Mr. *Tull* says; “ In Answer, I returned my Thanks
“ for the Offer, and the Reasons why I could not accept
“ of it. And that there was not a Conveniency of
“ sending the Engines from hence; neither would the
“ Man venture his Health in *Ireland*.”

I shall leave the Reader to draw his own Conclusions from this Letter, when he compares the *Event*, with the Progress I have made, towards the Establishment of Mr. *Tull's Husbandry in Ireland*, an Amendment in the common Husbandry, and the Improvement, in the Construction of, not to name the many Instruments I have invented.

When I began the Drill Husbandry here, the decisive Argument made Use of was, that it never would succeed in this Kingdom, and that it was Madness to attempt it; some People taking dogmatical Assertions for rational Arguments. It is true, I began it under all the Disadvantages that any Man could have to encounter with: the worst of Land, a total counteracting of me by my Workmen; and, even when my Crops arrived to some Degree of Maturity, the having had them destroyed by my own Cattle, I have Reason to believe, through the intentional Neglect of my Servants. And what contributed not a little to my Difficulty, was that of my being a Stranger, not having one Man about me whose Face I knew.

Under

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Under all these Circumstances of Difficulty, with many others which I could Name, I have persevered ; and have the Pleasure to see, that the Event hath shewn, I was much less mistaken, than those who so warmly gave their Opinions in the Beginning, against the practicability of the System ; for it is well known that I have perfected what I attempted, as far as the Time would permit ; and therefore I feel the less Pain at false Representations, and ungenerous Insinuations ; because Men who are capable of such Conduct, must be considered by all judicious Persons, as greater Enemies to their own Characters, than to those they are endeavouring to lessen.—For tho' Detractors, (like other Insects) prey upon the ripest Fruit ; yet they consider not, that what they attempt to take from another, they do not accumulate to themselves ; and should they even sometimes speak the Truth, yet it is Detraction still ; and will sink them in the Sentiments of *virtuous Men* : but when they use their darling Falseness, every honest Man will join to say, *the Actor wants a Name.*

It must be admitted, that there is great Merit in striking out new Points in any Science, where the Publick can be benefited by them : Yet, there is no Demerit in being a good Practitioner, be the Occupation what it may, altho' the Man should not strike out any Thing that is new. For it would be an hard Case, to say a Man is a bad Soldier, or a bad Engineer, (when he shall be fully Conversant in the established Discipline, both in Action and in Honour) because he shall “not have done any Thing that is new,” in the Art of Killing.

With Respect to my Case, I hope it is not expected, that I shall create new Plants, or that I shall form a new Earth. The Earth we have is what I have proposed to work upon, and to cultivate the Plants already created.

In those Points, as well as in the improvement and invention of Instruments, for facilitating the operations of hu-

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Husbandry, candid Inspection allows, that I have not been totally deficient; but what all ingenuous Men must admit to be meritorious, I have never attempted to build any Fame upon the Inventions of other Men; but on the Contrary, have always shewn a Pleasure in acknowledging whose Ingenuity I have been obliged to. If *all Men* would act upon the same Principle, I perhaps had escaped the Insinuation already mentioned.

I have a Right to say, that in my original Plan, for propagating the Knowledge of Husbandry in *Ireland*; I never proposed to the Publick that I would introduce any Thing that should be new, but to reduce Methods to practice in the Field by Experiments, which had been already invented, with an Expectation of improving the general Practice of Tillage in this Kingdom: and altho' Envy in one Man, and haughty Malice in another, may endeavour to throw a Cloud over what has been done towards that important Point, yet I trust, that Generosity of Mind which I have experienced in the Gentlemen of this Kingdom; will, like the Sun disperse the Cloud, and do me that Justice, which they shall imagine my Labours and Sufferings in their Service, shall be deserving of.

I shall be allowed further to urge, that suppose (for a Moment) no real Benefits had arisen to the Cause of Agriculture, from my own immediate Execution; Yet I think the most languid Well-wisher to that Cause, must admit, that what I have done, has at least diffused a spirit of Emulation in many Branches of Husbandry thro' this Kingdom, and that what I am continuing to do, keeps up that Spirit: a Spirit which is the Life and Soul of every Branch of Science and Manufacture. Without it no Perfection can be attained; Languor and Dissipation clog all our Endeavours and bar the Way to Success; and we through Ignorance or Pride, from our great Eagerness to dis-
culpate ourselves, too unjustly charge that to the innocent Object of our Pursuits, for which our own Folly and precipitate Despair alone are blameable. Hence it comes that we see in this Kingdom (not to mention
other

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other Branches of Manufacture) such extensive Tracts of Land, more like Deserts than an inhabited Country ; or, at best, yielding to the Labourer for all his Toil, but a sorry Pittance, scarce sufficient to enable him to starve at Leisure ; whilst those very Lands, had they been properly cultivated, would have enriched the Farmer, afforded a comfortable Subsistence to all his Dependents, and established the Empire of Plenty, where Want and Misery now reign. Whether the Man who has endeavoured to point out the Means to obviate those Inconveniencies, and to promote their opposite Advantages, deserves to be treated with the Malevolence already mentioned, must be left to the decision of every Well-wisher of his Country. But once for all to quit this disagreeable Subject,

I hope it will be admitted to be a Matter of no inconsiderable Consequence, that I have here in the interior Part of the Country, *created* and *introduced* a Branch of Manufacture, confined in its Views, *only to the Point of Agriculture*, which *together*, with the current Expences of my Farm, amounts upon the Article of Labour only, to at least One Thousand Pounds a Year. From this particular alone, it is to be presumed, some Benefit must arise to the Publick, abstracted from the great Expence in collecting and purchasing Materials, increasing the Number of Artificers, and raising large Quantities of Grain.

The Reader will see in his Passage over the following Sheets, that I pretend not to Infallibility, neither do I deal in Nostrums and Specificks. Pure Nature is my Guide ; 'tis her I court, by an assiduous, constant, and anxious Application, totally unincumbered with traditional Superstition.

From that Source I have received such Conviction, of the Superiority of the Drill Culture, that in a very few Years, I hope not to have an Acre of Corn in any other way ; and as no inconsiderable Step towards it, I intend this Year to sow twenty-four Plantation Acres under Wheat, altho' I cannot manure the Ground ; for I am convinced, that where the

Drill

Drill Culture shall produce from an Acre, *only four Barrels of Wheat annually*, that it will be upon an equality in point of Profit with the common Husbandry, altho' that shall produce *ten Barrels of Wheat and fourteen Barrels of Oats* from the like Quantity of Ground, *every three Years*. I am sorry to say, there are very few Acres in the Kingdom which produce any such Quantity. And much more than four will be produced from the Drill Culture, on moderate Ground.

And for the fuller satisfaction of the Publick, I take this Method to inform them, that I now have a Field of about 20 Acres under Fallow, which it is not in my power to manure at all, but I shall prepare it equally in every other Point of Preparation, and intend to sow the whole with Wheat, half under the Drill Culture, and the remainder in the common Way. This Field I intend to continue for three Years under this comparative Experiment, with a fair Account of Profit and Loss. An Experiment, which I flatter myself will be considered, as calculated for the Information, and consequently the benefit of the Publick.

I think it is no inconsiderable Consideration, that if this Culture will succeed upon my Land, so as to yield greater Profits, Acre for Acre, than the common Husbandry, that others may succeed much better, who have superior Land.

Amongst all the Objections which I have ever heard made to the Practice of the Drill Husbandry, that, of the want of Experienced Workmen to conduct it, is the strongest. But I have the Satisfaction to observe, that that is now become the *modern* Objection, because the actual Sight of it in the Field, forbids the old one, of its impracticability. But if our Fathers had considered such Objections as insurmountable, we should have wanted many Branches of Knowledge and Manufacture, which we are now happily in the Possession of.

However, respecting the Drill Husbandry, I take this Opportunity to assure the Publick, that I shall take pleasure in giving every Assistance for the promoting of it,

it, that is in my Power ; and shall continue to answer all Letters which shall be directed to me respecting that, or any other branch of Agriculture, with as much Expedition as my other Avocations will admit of. But as I am very incommodiously situated, respecting the Post Town, it frequently happens, that my Letters come to Hand, long after the Time in which I ought to receive them; which consequently retards the Answers.

I have been fuller upon the Subject of Lucerne in the following Sheets, than in any of my former Publications, because I find it superior to any other Grass that I have ever met with ; and I hope the various Experiments which I have made upon it, will so far answer the Purposes of the Publick, as to induce many Persons to adopt the Culture of it by Transplantation ; because Experience has assured me, that is the best Culture for it, of all others which have been yet attempted. In my former Papers, I have always spoken doubtfully of its Success in the broad Cast-way ; and I am now fully convinced, that under that Culture, it never can be a lasting Crop ; tho' I am willing to believe, a Method may be introduced, by which to make the Crop more lasting, thani has hitherto been in Practice ; and as soon as I can prepare Ground for the Purpose, I intend to attempt it, merely for the sake of the common Farmer ; with an hope to invite him to the better Culture, by giving him an Idea of the prolific Nature of the Plant.

The Article of Sainfoin I have not entered further upon, than just to state the Quantity produced, because my Experiments are not ripe for determining the best Culture for it, neither have I been yet able to be so extensive in the Cultivation of it, as I think it deserves.

Burnet is an Article which I have been much fuller upon, as will appear, and I believe it will be found a very valuable acquisition to the Tribe of artificial Grasses, tho' I have Doubts whether it will ever come up to all that has been said of it, as will appear by referring to that Article.

The Letters which the Reader will find upon the Subject of Bog, by way of Appendix, I had no Intention of publishing ; because they were no more than a private Correspondence ; but at the particular Request of several Gentlemen, (who have expressed a satisfaction, at my having indulged them as they are pleased to Term it, with the perusal of some private Letters,) I did promise a little Time ago, that I would publish such Parts of those Letters, as related to Bog ; altho' I did not think the Subject fully enough handled, to answer a general Purpose ; but I was answered, that many Gentlemen were circumstanced in the same manner, in point of Situation and Materials, with him who wrote to me upon the Subject. My Apology to him for publishing the Letters, appears in its proper Place.

At the End of the Appendix, the Reader will find a List of my Instruments, to which I have added the Prices, because I was requested so to do, by the *Dublin Society*, when I should publish my next List. In that List, I have described some of the Instruments, in order to give the Reader an Idea, how different the Machines must be, when compared with those which carry the same Name. But let no Man imagine, that even from the Description, he can form a Judgment of the Merit or Demerit of them. I wish every Man to see them, and then judge for himself.

INTRODUCTION.

On the 25th Day of July, 1765,

The RIGHT HONORABLE and HONORABLE
DUBLIN SOCIETY,

Were pleased to make the following
ORDER, *viz.*

“ THAT it be recommended to Mr. Baker, First Order
“ that with all convenient Speed, he will, of the Socie-
“ among his Experiments in Agriculture, al- ty.
“ lot a Portion of Ground, (not less than one Acre)
“ for the Culture of Wheat in Drills, Horse-hoeing
“ the Intervals; and that he also allot another Portion
“ of Ground (the same Quantity) for the Culture of
“ Wheat in broad Cast; that these two Portions of
“ Ground lie as contiguous to each other, and as much
“ of the same Sort of Soil as may be, that they be
“ both sown with the same Seed, and that Mr. Baker
“ report his Observations, resulting from this Experi-
“ ment, to the Society.”

INTRODUCTION.

And on the 13th of *March*, 1766, the Society were pleased to make another Order, *viz.*

Second Or-
der of the
Society.

“ That the Sum of 200*l.* be given to Mr. *Baker*,
“ to defray his Expences, and as a Recompence for the
“ Trouble he shall be at, in repeating and extending
“ his Experiments in Agriculture.”



EXPERIMENTS IN AGRICULTURE.

Experiments on WHEAT.

IN my Report for the Year 1765, I informed the Society, how far I had proceeded in the comparative Experiment between the Drill and Common Husbandry, in the Culture of Wheat. At the same Time I introduced a comparative Calculation of Expence and Profit, between the Drill and Common Husbandry, which, as I there said, were in a great Measure supported by the Experiments of another Gentleman, and which Experiments were recited in that Report.

It now remains for me to conclude my Report of that comparative Experiment for the *first Year*, in Obedience to the Order of the Society of the 25th of July, 1765, in which I flatter myself the Society will receive as full Satisfaction to the Question which they were pleased to propose, as the *first Year's Experiment* can furnish.

It may be remembered, that the Acre of Wheat sown in Drills, and that sown in the common Husbandry, half under the Plough, and half under the Harrow, were all sown on the 5th of October, 1765. See the Report for that Year, p. 48.

Winter-hoeing when performed.

The Drilled Wheat received the Winter-hoeing on the 20th of November following, as did all my other Drilled Wheat before the Expiration of that Month, and cost at the Rate of One Shilling and Seven Pence an Acre.

Winter-hoeing how performed.

The Winter-hoeing is performed with a small Plough, called the Hoe-plough, and two Horses yoked one before the other. This Plough passes at this Hoeing within about three Inches of the Corn, and throws the Earth from it. When this Operation is done on both Sides the Corn, the Soil forms a small Ridge in the Centre of the Alley or Interval, which is to remain in that Position until Spring.

The Form in which the Corn is left by this Hoeing, and the Effect.

By this Operation, the Corn is left upon a narrow Ridge of about sixteen Inches, the Sides of which are perpendicular, or near it. I have found in Practice, that by the Effect of the Winter; these perpendicular Sides, gradually Moulder down, and thereby, form a gentle Declivity from the Rows of Corn to the Furrows. This Mouldering of the Soil, by the mechanical Operation of the Winter, must greatly contribute to the Health and Vigor of the Plants.

Stiff Soil runs together by Wet. How reduced in the Drill Culture.

But I find where a Soil is naturally stiff, altho' it be ever so well reduced,* that it will by Rain, run together again, and acquire a compactness, approaching to its former Tone of stiffness.† Finding this to be the Case after

* It is a great Check to the Improvement of Tillage, that the common Farmer does not know, that there is no reducement of any Soil by Machines, equal in any Proportion, to that of its being reduced by the Atmosphere. (Altho' Machines must be employed to put the Soil in the Way of being so reduced) Could we once firmly possess him of that important Fact, he would Endeavour to break his Furrows in September and October, instead of April and May.

† To a Man convinced of the Truth of the foregoing Note; the great superiority of the Drill Culture must appear very strongly, because in that we can remove this Obstruction to the Growth of Plants caused by the acquired stiffness of the Soil; whereas, in the Common Husbandry we can use none of those Means, but must let the Roots of the Plants remain in their imprisoned State.

after Winter, in the Furrows left by the Winter-hoeing, I did imagine it would tend to the Advantage of the Crop, to loosen the Soil next to the Corn, before that in the Alley or Interval should be returned to the Corn, because it must give greater freedom to the Passage and Extension of the Roots; whereas, if the Soil in the Alleys, was to be thrown over this fine Earth in the Furrows, and which the Winter Rains have consolidated in Manner already mentioned, the Roots of the Plants would have that to labor through, before they could approach the fine Earth which would be thrown over it by the Hoe Plough, out of the Alley up to the Corn.

Three Inches are named as the Distance to be left on the Outside of each Drill, at the Winter Hoeing.

In Practice I have found *that* the proper Distance. Whereas, when I began this Culture, I had my Hoe Plough directed (as some Writers have recommended) as near the Corn as possible: but in the Pursuit of that Practice, I found manifest Inconvenience; for in Consequence of the Earth moulder down in the Manner already described, the Plants also came down into, and some hanging upon the Verge of the Furrow, by which Means, when the Soil was to be returned to the Corn in the Spring, many of the Plants would be unavoidably covered. Another Inconvenience arose from this Practice, which was, that in severe Winters, the Roots of the Plants were too much exposed to the Frost. Whereas I find none of those Inconveniences now arise, since I have adhered to the Rule of approaching the Plants at the Winter Hoeing no nearer than about three Inches.

To loosen the Earth which moulders down and consolidates during the Course of the Winter, in the Manner already described, I have introduced the Instrument which I call the single Cultivator. This Instrument is a Plough, but without any Mould Board.

With this Instrument I go as near the Corn as possible, and as early in the Month of March as the Weather will admit, for this, nor no other Instrument must be used when the Land is wet.

And the Benefit arising to the Crop.

Winter-hoeing within 3 Inches of the Corn, and why no nearer.

Spring-hoeing begins with the single Cultivator, and why. Single Cultivator described. How used.

Experiments on Wheat.

Effect of the single Cultivator.

Approaching the Plants so nearly at this Season, and loosening and deepening the Soil at their Roots, has an happy Effect; for in a few Days the Plants are incredibly invigorated and enlarged, insomuch, that it was the Opinion of the Vulgar respecting the Crop now in question, that the Corn must inevitably rot upon the Ground.

When Winter Corn begins to tiller.

In the Month of *March*, and even *February*, if the Weather be favourable, it is, that all Winter Corn begins to plant or tiller, *i. e.* to throw out its Number of Stems from each Plant or Grain, in Proportion as the Soil and Culture is capable of multiplying them.

Reasons for the Spring hoeing.

Hence arises the Reason for the Spring hoing of drilled Corn, because in this Operation, we greatly aid the Efforts of Nature, in multiplying the Stems, and by which we so much multiply the Ears of Corn *

Spring hoing with single Cultivator, when it was done, and the Ex- pence.

On the 15th of *March* the Acre of drilled Wheat, now in question, received the Spring hoing with the single Cultivator, as did all my other drilled Wheat immediately after, which cost in the first Operation one Shilling and two Pence half-penny an Acre.

How the double Cul- tivator is first used, and why.

In as short a Time as may be after this Operation, in which it is best not to exceed a Fortnight, the little Ridge lying in the Centre of the Interval, from the Winter-hoeing, as hath been already described, is to be returned to the Corn; the better to prepare it for which, the Cultivator (the double one is best) is to be run through the Middle of it, immediately after culti- vating the Sides, as was before described; by which Means

* At the same Time that we obtain these happy Effects, let the Reader carry in his Mind the grand and principle One of this Culture, that upon the Spring Hoeing being finished as I now do it, that our Fallow for the succeeding Crop has been three Times stirred or ploughed, at which Time, there are few common Fallows in the Condition this is in, even when they are sown; and to shew it yet in a stronger Light, these Operations are compleatly done with two Horses, instead of four, which are used in the com- mon Husbandry, and that instead of working half an Acre of Fallow in a Day with four Horses, here we work two Acres a Day with two.

Means, the Soil is finely prepared, and very friable, when it is to be thrown to the Corn; and therefore is in an high State for feeding the Plants, because the Roots can most easily penetrate it, in Search of Food.

This Operation immediately followed that of culti- The Ex-
vating the Sides of the Corn, and cost at the Rate of pence of
Eight-pence an Acre. using it.

On the 30th of March, the Hoe-plough was intro- Final
duced, to return the Soil up to the Plants; which cost Spring-hoe-
at the Rate of One Shilling and Five-pence Halfpenny ing, when
an Acre. done, and
the Ex-
pence.

In throwing the Earth up to the Corn, it will hap- Earth fall-
pen in some Places, that as it moulders down off the ing upon the
Mould-board of the Plough, that some of it will fall Corn, to be
upon the Corn; in that Case a Man is to follow with a raked off.
wooden toothed Rake, to take off the Mould. If he be-
gins four or five Hours in the Day after the Plough be-
gins, he will finish with the Plough at Night, and con-
sequently this Operation will cost about Three-pence an
Acre.

This Hoeing is still to contribute to the Increase of Effect of the
Branches from each Stock, and to invigorate their final Spring-
Growth, as well as to prepare the Ground for a suc- hoeing.
ceeding Crop.

In May some Weeds had shot up in the narrow In- Weeds,
tervals between the Drills, which were removed by when and
Hand, and Hand-hoes; this Work cost me Seven-pence how remov-
Farthing an Acre for all my drilled Wheat. ed, and the
Expence.

Thus the Corn remained till the 17th of June, when Summer-
the Farina began to appear *, upon which all drilled hoeing,
Corn should receive the Summer and final Hoeing, when to be
which is to throw up with the Hoe plough another Sod done.
to each Side of every Ridge. Upon this Appearance
mine was Horse-hoed, and cost one Shilling and Five-
pence an Acre.

* If the Corn shall be very strong, it will be safest to perform this Operation before the Ears appear, because it will be inconvenient to work between the Rows afterwards.

'This Operation restores the Ridges to the Form they were in, when the Corn was sown.'

**Double Cultivator when to be used.
Its Use and Expe[n]ce.**

The double Cultivator should now be run in the Middle of the Interval or Furrow, to deepen and loosen the Soil, not only to allow the Roots of the present Crop to approach it; but also, the more effectually to prepare the Ground for the succeeding Crop. This Operation was performed in mine immediately after the preceding one, and cost Eight-pence an Acre.

Drilled Wheat, when reaped, and the Expe[n]ce.

On the 28th of *August* I reaped the Acre of drilled Wheat, to do which took two Men a Day, and one Man Half a Day, at sixteen Pence a Day each Man; and therefore reaping this Acre cost Three Shillings and Four-pence.

This Corn I stacked in the Field, for Reasons which will appear presently.

An Acre of Wheat in the common Husbandry.

The Acre of Wheat, sown in the common Husbandry, was described in my Report of last Year; and therefore I have no more to do now, than to report the Expe[n]ce of weeding, reaping, thrashing, and the Produce of the two Experiments in that Way, and then to compare them with each other.

Expe[n]ce of weeding of it.

The Acre which was under the common Husbandry, it may be remembered, had been two Years before under the Drill Husbandry, which greatly contributed to a lessening of the Weeds; and therefore this Acre cost only One Shilling and Six-pence for weeding.

When it was reaped, and the Expe[n]ce.

The Corn was reaped on the 23d of *August*, and took three Men a Day to do it, which at Sixteen Pence a-piece amounts to Four Shillings. Every Farmer knows, that when three Men shall reap such an Acre of Corn in a Day, as this was, that they must have very much exerted themselves.

Thrashed before the drill-ed, and why.

This Corn being cut, and that five Days before the drilled, a Difficulty arose from my Want of Barn-room, my

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my Fire having prevented my finishing a Barn which I had began to build.

Every Farmer knows, that a considerable Waste must be incurred by stacking Corn in the Field; for that Reason I was apprehensive, that if I stacked the Corn of the common Husbandry, it might be imagined I did it to the Favour of the Drill Husbandry, and in Prejudice to the common. For these Reasons, and to avoid any Cavil on that Head, I determined to give the common Husbandry the first Advantage, by taking the Corn in directly, and thrashing it without Delay, and to stack that produced from the drilled Acre in the Field; but the next Time they shall be both under Wheat again, it will be fair to take the drilled in first, and to stack the other in the Field.

The Produce of the Half Acre sown under the Plough amounted to 5 Barrels, 9 Stone and 6 Pounds, and of Straw 23 Hundred Weight and 15 Pounds. In this Proportion, an Acre would have produced 10 Barrels, 18 Stone, and 12 Pounds of Wheat, and of Straw 2 Tons, 6 Hundred, 1 Quarter, and 2 Pounds.

The Half Acre which was sown under the Harrow produced, of Wheat 5 Barrels, 5 Stone, and three Pounds, and of Straw 21 Hundred Weight, 3 Quarters, and 19 Pounds. In this Proportion an Acre would produce of Wheat 10 Barrels, 10 Stones, and 6 Pounds, and of Straw 2 Tons, 3 Hundred, 3 Quarters, and 10 Pounds.

The drilled Acre produced of Wheat 7 Barrels, 11 Stones, and 5 Pounds, and of Straw 1 Ton, 19 Hundred, 1 Quarter, and 22 Pounds.

Hence it appears upon the first View, that Ground being equally prepared, and sown in the three different Methods practised in this Set of Experiments, will exceed each other for the first Crop, in the following Proportions.

And

Experiments on Wheat.

Equitable
Manner of
comparing
them.

And in order to give the common Husbandry every Advantage, that its warmest Advocates can expect or desire, let it be observed, that in comparing the Produce of that with the drilled, that I shall not take the Produce of the Acre under the common Husbandry together, because two Methods were made use of, but that I shall double the Produce of that obtained from sowing under the Plough, as being the greater Crop, and compare that against the drilled.

Produce of
the three Me-
thods com-
pared.

Ground being equally prepared, and sown under the Plough, under the Harrow, and in Drills, exceed each other in the following Proportions, for the *first Crop*. An Acre under the Plough produces more than an Acre under Drills, of Wheat 3 Barrels, 7 Stone, and 7 Pounds, and of Straw 6 Hundred, 3 Quarters, and 8 Pounds *. And sowing under the Plough produces more than under the Harrow, of Wheat 8 Stone 6 Pounds, and of Straw 2 Hundred, 1 Quarter, and 20 Pounds.

The Quality
of the Corn
examined.

But now let us investigate this Matter in another Light, before we proceed to make any comparative Calculation, which will bring us something nearer to the solid Truth, whereas I consider the above View only as a superficial Truth.

Weight and
Number of
the Grains
compared.

First as to the Size of the Grain. One Ounce Avoirdupoize of the Wheat raised in the common Husbandry contains 731 Grains, and one Ounce of the drilled contains 682 Grains. This shews that the Grain is larger from the Drill Culture than the common, although the Ground shall be equally prepared,

* But if we add the Seed saved in drilling the Acre already mentioned, which was 13 Stone and 11 Pounds, it will make our drilled Crop equal to 8 Barrels, 5 Stone, 2 Pounds, which leaves an actual Difference between the two Methods, of only 2 Barrels, 13 Stone, and 10 Pounds. And I wish, for the Benefit of this Country, that it could be said 8 Barrels, 5 Stone, and 2 Pounds of Wheat is in general produced from the common Husbandry.

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because we see by this Comparison, that an ounce takes 49 Grains more of the Corn raised by the common Culture, than it does of that raised in Drills.

A Bushel, *Winchester Measure* of nine Gallons, of Weight and the Wheat raised under the Plough, weighed four Stone, seven Pounds, and four Ounces ; the same Measure of the drilled weighed four Stone, nine Pounds, and six Ounces. In that Measure, here is a Superiority, in Favour of the drilled, of two Pounds and two Ounces, which, upon a Barrel, amounts to about ten Pounds and fourteen Ounces.

Hence we see, that a Measure which would contain 20 Stone of drilled Wheat, would not contain the same Weight of that raised in the common Husbandry by about ten Pounds and fourteen Ounces, although the Ground shall be equally prepared, and consequently the drilled Wheat must be by so much the better corn.

In *England* this would have a just Right to be carried to the Credit of the Drill Culture, because the Corn is there sold by Measure, and not by Weight ; and it is reasonable to imagine, that the heaviest Measure of Corn must produce the largest Quantity of Flour.

But as our Corn is sold here by Weight, (and most certainly, very wisely so, to the Advantage of the Consumer) what inferior Corn fails in Bulk, when compared with superior Corn, must be made up in Weight, five Stone of Corn being understood to be a Bushel, although I have never seen any that a measured Bushel of it would weigh five Stone.

However, selling the Corn here by Weight being the established Rule, brings the Quality of the Corn in these two Experiments pretty near upon an Equality ; for I sent five Stone of the Corn from the common Husbandry, and five Stone of the drilled to the Mill, and upon the sifting, there was but a trifling Difference in the Produce of Flour in Favour of the drilled.

I am

I am the more solicitous, for the Sake of Candor, to mention this, because it seems to appear, that where the Ground shall be *equally prepared*, that *equal Weights* of the Corn produced therefrom will produce pretty near equal Weights of Flour; whereas I have observed in the Course of my reading, that this Experiment has been generally made by grinding the Corn of some other Field, and I conclude, inferior Ground, with the drilled Corn growing, as I now suppose, upon superior Ground; and therefore the drilled Corn has always beat the other in Produce of Flour, even at equal Weights. And I own I did imagine it would have been so in the present Case; but the Fact I find to be otherwise, and therefore I consider it as my indispensable Duty to state it.

However, where the Corn shall be sold by Measure, as it always is in *England*, a Bushel of this drilled Wheat must have produced more Flour than a Bushel of the broad Cast, because we see that a Bushel of the drilled weighs two Pounds and two Ounces more than the other.

Improbable
that the
common
Husbandry
will contin-
ue to pro-
duce as
much here-
after.

I must also observe, that it must not be expected, at least I think it improbable, that the succeeding Wheat-Crops which shall be upon this Acre of Land, under the common Husbandry, will be equal to the first Crop, either in Quantity or Quality, upon which, it may be remembered, I have always rested the Merit of the Drill Husbandry, though, in my comparative Calculation last year, I stated the common Husbandry always to produce nine Barrels.

Ground un-
der the com-
mon Hus-
bandry pre-
pared for
Oats.

Before I proceed to state the Expence and Produce of these Experiments, I shall just observe, that of the Acre which I had under the common Husbandry, I ploughed Half of it last October, and left the other Half under Stubble, in order to sow the whole with Oats this Spring. And in this Article I took the Sense of the Society, as I was apprehensive, that if I had omitted to give any of the Ground two Ploughings for Oats, that the Opponents of the Drill Culture might charge me with not having done Justice to the Ground. And

had I ploughed the whole, some might say, that I incumbered the Land with an unnecessary Expence, because twice Ploughing for Oats is not the general Practice. However, by the Method taken, I hope I shall not only escape any Censure on that Head, but that we shall obtain a good Experiment from it, whether twice ploughing for Oats does or does not answer the Expence.

The Acre which was under the drilled Wheat was once ploughed after the Crop came off, and was again sown with Wheat on the 18th of October, 1766, with five Stone and two Pounds of Seed. This Corn is now, the 23d of March, in a very flourishing State, and is the fourth drilled Crop in Succession upon the same Ground without Interruption *; and the Land is really in a Garden State, in Point of Culture, for it is well reduced, and free from Weeds.

Drilled A-
cre again
sown with
Wheat.
Its Appear-
ance in
Spring.

It has (I can hardly say) been a controverted Point, because almost all the Writers seem, in a Manner, to be unanimously of Opinion, that the seed should be frequently changed; urging, that where the same Seed shall be sown repeatedly upon the same Land, that the Species must and will degenerate. And some have gone so far, as to enter into Arguments, in Support of the Doctrine of Transmutation. The latter Point I have always looked upon in the Light it deserves, and the Light in which every Man must look upon it, who will not allow his understanding to be incumbered, and shackled, with Superstition and old traditional Stories, springing originally from the Machination of Priestcraft, to keep in a State of Subordination, the weaker Minds of Men, and by which to sanctify their Pretensions to the Power of producing Miracles.

Change of
Seed not ne-
cessary.

Transmuta-
tion founded
on Supersti-
tion.

But I own, the Credit of many of the Writers, added to the Reasons they have given, in Support of the first Point, had, for some Years, great Influence upon my Mind; because plausible Probability appeared to accompany their Arguments; which, added to a Wil-

Change of
Seed more
reasonable
than Trans-
mutation.

* In the Year 1764, Turneps; 1765, Barley; 1766 and 1767, Wheat.

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lingnes to believe they wrote from Experience, and a Consciousnes of my own Inexperience, induced me to believe the frequently changing of Seed a wise and prudential Doctrine.

But yet founded on mistaken Principles.

But I find, although that Doctrine may not be quite so superstitious as that of Transmutation; yet it is clogging and loading the Business of Agriculture with Arguments and Precautions founded upon no Basis, because there is neither Truth nor solid Reason to support it.

Steeps equally ridiculous with Transmutation.

It is nearly allied to the miraculous Volumes, I may say, which we have upon the Subject of Steeps, (tho' perhaps not quite so superstitious) invented by Monks and Friars, Garretteer Farmers, catch-penny Writers, and Peasants.

Agriculture might flourish, if Superstition was banished.

Would the Day once arrive, that Men should join in Opinion, to throw all this Trumpery to the Use of the Chandler, or an inferior Office; Agriculture, then unincumbered, might rise into a Science, stamping indelible Honours upon the Professors and Improvers of it.

Same Seed sown on the same Ground, and improved thereby.

But to the Point of changing the Seed, I am to say, that the Wheat which I sowed for these Experiments was of the Growth of this Land, which I bought standing when I took the Farm, and of which I had not a Crop of three Barrels upon any one Acre. This Corn that Year took above 1000 Grains to weigh an Ounce, for no other Reason, I am satisfied, than because it was, during its Existence, ever in a State of Hunger, without being fed. And Vegetables, as well as Animals, will remain Dwarfs, if they are starved.

I have used the Produce of the same Corn ever since for Seed, which, by better Culture, has been improved from Time to Time on the same Land, till it appears now to take only 682 Grains to weigh an Ounce; and that in as bad a Year for Wheat as hath been known for many Years, it being notorious, that all Europe now suffers by the Failure of the Crops, and Insufficiency of the Corn in general.

And

And I do not build my Opinion upon this Experiment only, because I did once before bring Wheat from 900 Grains to an Ounce, upon the same Land, to take only 560 to weigh an Ounce.

This, I think, seems to prove beyond Contradiction, that it is not the *Quality* of the Seed in any respect, except that of its being sound, which governs the Crop; but that it wholly depends upon the good or bad Culture, and other Preparation of the Land, upon which it shall be sown.

In the last Season for sowing, I introduced another Kind of Wheat * for drilling, which none of my Neighbours have, in order wholly to get into that Seed, for very aggravating Reasons; but I did not think it would be quite fair, in my comparative Experiment, to sow it this Year upon the drilled Acre in Question, and therefore I have sown of the Corn which *actually grew upon* it; but when the Acre allotted to the common Husbandry comes to be sown with Wheat again, I intend to sow that and the drilled Acre with the Seed which I have now introduced.

I shall now state an Account of Profit and Loss, as Comparative Account of Profit and Loss, occurred upon these Experiments, and then give my Reasons for the Prices affixed to each Article of the Produce; and in this I shall state the Experiment under the Plough at an Acre, as I did last Year, and that under the Harrow in the same Manner. See Report for 1765, P. 53.

* Let it not be imagined that this Corn was obtained by Purchase, I had only two Quarts of it, which I brought from England with me, and have been sowing it upon this Land ever since. Some of it I have ground, and in the next Harvest I expect to have near an hundred Barrels of it.

Dr. One Acre of Wheat in Drills, according as the Expence arose.

		l. s. d.
1765.	First ploughing and harrowing —	0 12 11
	Second ploughing * —	0 10 4
Oct. 5.	Drill-harrowing —	0 0 4½
	Drilling the Seed Corn —	0 0 9
	Seed Wheat, six Stone and three Pounds	0 6 2½
Nov. 20.	Winter Horse-hoeing —	0 1 7
1766.		
Mar. 15.	Spring Horse-hoeing with the single Cultivator	0 1 2½
	Do. with the double Cultivator —	0 0 8
30.	Returning the Earth to the Corn with the Hoe-plow —	0 1 5½
May 12.	Weeding —	0 0 7½
June 17.	Third Hoeing, still returning the Earth to the Corn —	0 1 5
	Deepening the Furrow with the double Cultivator —	0 0 8
Aug. 28.	Reaping the Corn † —	0 3 4
Sept. 29.	One Year's Rent —	0 18 0
	Thrashing 7 Barrels, 11 Stone, 5 Pounds	0 5 7½
		<hr/>
	To neat Profit upon the first Crop —	3 5 1½
		9 11 5½
		<hr/>
		12 16 7

* Why a second Ploughing was necessary, see Report 1765, p. 48.
† See Page 12.

*Per Contra.**Cr.*

1766. By Wheat, 7 Barrels, 11 Stone, 5 Pounds, at 30s.	<u>I.</u>	<u>s.</u>	<u>d.</u>
	11	7	0 $\frac{1}{4}$
By Straw, 39 Hundred, 1 Quarter, 22 Pounds, at 9d.	<u>—</u>	<u>—</u>	<u>—</u>
	1	9	6 $\frac{1}{4}$
	<u>12</u>	<u>16</u>	<u>7</u>

B 3*Dr.*

Dr. One Acre of Wheat sown under the Plough, according as the Expence arose.

		l. s. d.
	First ploughing and harrowing	—
1765.	Second ploughing	0 12 11
Oct. 5.	Sowing under the Plough. See Report 1765, p. 49.	0 10 4
1766.	Seed Wheat one Barrel	—
May 12.	Weeding *	1 0 0
Aug. 23.	Reaping †	0 1 6
Sept. 29.	One Year's Rent	0 4 0
	Thrashing 10 Barrels, 18 Stone, 2 Pounds	0 18 0
		<hr/>
	To neat Profit upon the first Crop	4 1 8
		14 1 2
		<hr/>
		18 2 10

Dr. One Acre of Wheat sown under the Harrow, according as the Expence arose.

		l. s. d.
1765.	First ploughing and harrowing	—
	Second ploughing	0 12 11
Oct. 5.	Sowing under the Harrow	0 10 4
1766.	Seed Wheat, 16 Stone and 2 Pounds	0 2 3
May 12.	Weeding	0 16 2
Aug. 23.	Reaping	0 1 6
Sept. 29.	One Year's Rent	0 4 0
	Thrashing 10 Barrels, 10 Stone, 6 Pounds	0 18 0
		<hr/>
	To neat Profit	3 13 0 $\frac{1}{2}$
		13 15 5 $\frac{1}{4}$
		<hr/>
		17 8 5 $\frac{3}{4}$

* See Page 12.

† Ibid.

Cr.

*Per Contra.**Cr.*

1766.	By Wheat, 10 Barrels, 18 Stone, 2 Pounds, at 30s.	l.	s.	d.
		16	8	2
	By Straw, 46 Hundred, 1 Quarter, and 2 Pounds	—	—	—
		1	14	8
		18	2	10

*Per Contra.**Cr.*

1766.	By Wheat, 10 Barrels, 10 Stone, 6 Pounds, at 30s.	l.	s.	d.
		15	15	8
	By Straw, 43 Hundred, 3 Quarters, 10 Pounds	—	—	—
		1	12	9 $\frac{3}{4}$
		17	8	5 $\frac{3}{4}$

The Price of
Wheat 30s.^a
Barrel.

And why.

In the stating these Accounts, I have valued the Wheat at One Pound and Ten Shillings a Barrel, which is the Price I did sell some of it at, and could have sold the Whole at that Price, could I have spared it. And as the current Price of Wheat since last Harvest has been thereabouts, I should have done manifest Injustice to the Common Husbandry, had I stated the Price lower. For suppose I had valued the Produce of the Three Experiments at Twenty Shillings a Barrel, there would have been an Injury done to the Credit Side of the Account of the Common Husbandry, of Ten Shillings a Barrel, upon the whole Quantity in which it exceeded the Drill in Point of Produce. Namely 3 Barrels 7 Stone and 7 Pounds, which would Amount to 1l. 13s. 9d. and certain it is, that the Corn produced, be it from what Mode of Culture it may, should be charged at what it will bring.

Drill Cul-
ture has the
best Chance
of Markets.

Besides, were it to be otherwise charged, it must eventually tend to a real sinking of the Profits which will arise from a Pursuit of the Drill Culture, which producing Wheat every Year without Intermission, certainly must have a better Chance, for the Rise of Markets, than Land which produces Wheat only every third Year. And therefore, I shall always Charge the Produce of these Two Acres, for the Six or Nine Years, in which I Propose to continue them under the Modes of Culture already prescribed, at the Prices which the Produce will fetch.

Merit of the
two Methods
of Culture
not to be af-
certained by
One Crop.

In my Report for the Year 1765, p. 64, I there mentioned, that I thought the Question did not depend upon which Mode of Culture would Produce the most Corn upon One Crop, but the fair Question seems to be, which will Produce the most Money to the Farmer, in any given Number of Years. Which ever Method will do that, is certainly to be preferred, because in that it is, which the Publick are materially and capitally interested.

The Profits
of the Three
Methods
compared.

We see, upon the Face of the Accounts already stated, that Three Acres of Ground being equally prepared

pared and sown in equal Quantities, with Wheat, under the Plough, under the Harrow, and in Drills, the Crop producing 30 Shillings a Barrel, will exceed each other in Point of Profit, in the following Proportions, *viz.* That under the Plough yields a larger Profit than that under the Harrow, by 5*s.* 8*d.* $\frac{3}{4}$, and more than that under the Drill Culture, by 4*l.* 9*s.* 8*d.* $\frac{3}{4}$. But let it be remembered, that this is only for the *first Crop*.

If I had charged the Corn at only 20*s.* a Barrel, the Advantage in Favor of the Common Husbandry, would have been only 2*l.* 15*s.* 11*d.* $\frac{3}{4}$, for the first Crop.

But let us take it at the highest. Namely, 4*l.* 9*s.* 8*d.* $\frac{3}{4}$, which is so far as the Difference between the smaller and larger Sum, an Accident the first Year, in Favor of the Common Husbandry. How may we Expect the Profits to stand next Year, supposing we obtain, even 14 Barrels of Oats from the Acre under the Common Husbandry; and 7 Barrels Ten Stone of Wheat, and the same Straw from the Drilled Acre; and that the Wheat sells at only 20 Shillings a Barrel, the Amount will be 8*l.* 19*s.* 6*d.* $\frac{3}{4}$, out of which we are to deduct the Expences, i. e. 2*l.* 12*s.* 2. $\frac{3}{4}$, the Profit then remaining will be 6*l.* 7*s.* 4*d.* but if the Wheat should bring 30*s.* a Barrel, we shall have a Profit of 10*l.* 2*s.* 4*d.*

Now if we obtain 14 Barrels of Oats from the Common Husbandry, and Wheat should be at 20 Shillings a Barrel, the Oats will be about Six, as I stated last Year. In that Case our Crop will bring about 4*l.* 4*s.* out of which we are to deduct 2*l.* 5*s.* 2*d.* for Rent, Seed, Plowing and Harrowing, exclusive of Reaping and Threshing, which will reduce our Profit to 1*l.* 18*s.* 10*d.* But if Wheat shall bring 30 Shillings, the Oats will be about Ten, which will augment our Profit to about 4*l.* 14*s.* 8*d.* not charging the Seed Oats already used at more than Six, altho' they would bring Ten Shillings a Barrel.

Let us now add the smallest presumptive Profit upon the Oats to the superior Profit of the past Crop, namely,

Experiments on Wheat.

ly, 1l. 18s. 10d. to 4l. 9s. 8d. $\frac{1}{4}$, which together make 6l. 8s. 6d. $\frac{3}{4}$, and compare this with our smallest presumptive Profit upon the Drilled Acre, and the Balance in Favor of the Common Husbandry will only be *One Shilling and Two Pence Three Farthings*. Before I proceed further, I must here ask the Advocates for the Common Husbandry what it is I have given to obtain this *One Shilling and Two Pence Three Farthings*? have I not sacrificed an Acre of Ground which had been very highly improved? have I not by these Two Crops destroyed its Health and Vigor, and must I not, according to their System, not only let it lie the whole succeeding Year in Fallow, but at a very heavy Expence, Plough and Harrow it several Times? in Order to obtain another Crop in that Way?

But to return. If we Compare the two larger presumptive Profits; that is, if we add the superior Profit of the past Crop, to the larger presumptive Profit upon the Oats, the Amount will be 9l. 4s. 4d. $\frac{1}{4}$. By deducting this out of the larger presumptive Profit upon the Drilled Acre, the Balance will be in Favor of the latter to the Amount of 17 Shillings and 11d. $\frac{1}{4}$, and that at the End of the Two First Years.

Conclusion
shews the
great Superi-
ority of the
Drill Cul-
ture.

Will it not appear then, much stronger to every Man, who will consider the Matter dispassionately, for when we come to the third Year, we may Expect such another Crop from the Drilled Acre, at a Time when that Acre which is devoted to the Common Husbandry, must be under Fallow, in curing an heavy Expence in its preparation for Wheat? How is it possible, that Acre can ever again, overtake the Drilled in Point of Profit, when the Drilled, supposing the Crop to produce only 20 Shillings a Barrel, will be that Crop in Advance, in Point of Profit; and every *third Year*, will in the like Manner gain a Crop?

The Drill
Culture in-
judiciously
condemned.

I have been spoken of by some Persons in an odd Manner, respecting my being an Advocate for this Culture; they urging, that it is impossible Ground should Produce successive Crops in the Drill Way. But in Extenuation (I suppose

pose they mean) of my Guilt, they say, that I am Drill Mad. This is really a strange Way of condemning a System, and pronouncing upon the Intellects of a Man, who values himself upon no other Merit, than that of most anxiously and laboriously seeking the Truth for the Benefit of Mankind, in Discharge of the Trust reposed in him, by his Patrons, the DUBLIN SOCIETY, which I flatter myself must appear in this, as well as the other little Things which I have sent into the World.

But I would ask the Persons who have been thus free in pronouncing upon my Sanity, and condemning a System, which I am sure was not framed by a Madman, whether they have had any Experience of it? and for how long? and if they have, whether they have in their Practice, done Justice to it? Any Man who will assert this, and then condemn the System, would hardly be worth my Notice, because in the first Instance, he must offer great Violence to the Truth. But when even *such a Man* appears, he will receive his Answer.

But let us suppose for a Moment, that successive Crops cannot be produced for a Series of Years, what will the prejudiced Theorists gain by that? not enough surely to condemn the System and the Practitioners of it. Since no Man will say I hope, that successive Crops cannot be obtained for Three Years, because the Ground already described, is now under the fourth Drilled Crop in Succession, and I think is equal if not superior to the preceding. And therefore, if we can produce but Three Crops in Succession, before the Ground wants Assistance, will not this Culture greatly outweigh the Common, in Point of Profit, stating it even at the Produce which has been already named? for it plainly appears, that our Third Crop, will be a neat Profit in Three Years, *over and above the common Culture*, which amounts to above 40s. *per Annum*, for that Time, on every Acre so managed.

Again, let us suppose, that in Three, or any other Number of Years, the Ground under this Culture should want Assistance; how easy will it be, to sprinkle a small Portion of Manure in the Furrows, before the

Ridges

Experiments on Wheat.

Ridges are turned over, by which the Two Rows of Corn will stand immediately over it. At least Half the Manure, if not a Third of that which would be required to an Acre under the Common Husbandry, would replenish and invigorate an Acre under this Culture. And that without losing a Year in preparing fallow, as must ever be the Case in the Common Husbandry.

This is a Method which I intend to execute on some of my Ground which is now under the second Crop of Drilled Wheat, and which I cannot learn from the oldest Man of the Neighbourhood, ever to have had any Manure at all, and yet I have had tolerable Corn from it, even in this so much degraded System.

**Good Effect
of the first
comparative
Calculation.**

The comparative Calculation of Expence and Profit, which I introduced in my Report of last Year, and of which the Society were pleased to order 4000 Copies to be printed on a Broadside, exclusive of the Report at large, has had so good an Effect, that there are now many more Advocates for the Drill Culture than there was, and I think there are 17 or 18 Gentlemen and Farmers, since that Publication, who have actually determined to enter into the Practice of it.

**Reasons for
now giving
another
comparative
Calculation.**

**And the
Terms in
some Mea-
sure explain-
ed.**

But as that comparative Calculation, was made in some Measure, from presumptive Calculations of Expence and Profit, and that some Articles of Expence could not then be accurately ascertained, I shall now restate a comparative Calculation, for the fuller Information of the Publick. And in stating these Accounts, I shall State the Drilled at Seven Barrels and an Half, which being under the Quantity actually produced, and that in so bad a Year as the last for Wheat, we may I think, pretty safely depend upon that Quantity One Year with another.

The Produce of the Common Husbandry I shall State at Ten Barrels, altho' that is certainly more than it can Continue to produce, notwithstanding more was produced in the first Experiment; but then I beg it may not be forgotten, that the Ground had been Two Years under

under the Drill Culture, greatly to the Advantage of the Crop, when sown under the Common Husbandry.

In the following Calculations, I State the Wheat at only 20 Shillings a Barrel, except the Crop already obtained, altho' great Injury must be done to the Credit Side of the Account of the Drill Husbandry thereby, because that Culture has Three Chances for the Rise of Markets, to One of the Common Husbandry.

The Calculations will begin with the Two Acres now in Question, and the actual Expence already incurred thereon, which still gives an Advantage to the Common Husbandry, because it commences without being loaded with the Expences always attendant on the preparation of Ground for Wheat in that Way.

Dr.

*Dr. One Acre of Wheat in Drills for
fourteen Years.*

		<i>l. s. d.</i>
	First Preparation of the Ground and Sowing. See Page 26, and Report 1765, p. 53.	1 10 7
Octob. 5.	Winter, Spring, and Summer hoings,	
1766.	Weeding, Reaping, Thrashing, &c. See Page 26,	1 14 6 $\frac{1}{4}$
	The first Year's total Expence,	3 5 1 $\frac{3}{4}$
1767.	The 2d Year's Expence. See Page 11, only one ploughing being necessary. Seed, Rent, the several Hoings, Weeding, Reaping, Thrashing, &c.	2 12 2 $\frac{3}{4}$
1768.	The 3d Year's Expence,	2 12 2 $\frac{3}{4}$
1769.	The 4th Year's Expence,	2 12 2 $\frac{3}{4}$
1770.	The 5th Year's Expence,	2 12 2 $\frac{3}{4}$
1771.	The 6th Year's Expence,	2 12 2 $\frac{3}{4}$
1772.	The 7th Year's Expence,	2 12 2 $\frac{3}{4}$
1773.	The 8th Year's Expence,	2 12 2 $\frac{3}{4}$
1774.	The 9th Year's Expence,	2 12 2 $\frac{3}{4}$
1775.	The 10th Year's Expence,	2 12 2 $\frac{3}{4}$
1776.	The 11th Year's Expence,	2 12 2 $\frac{3}{4}$
1777.	The 12th Year's Expence,	2 12 2 $\frac{3}{4}$
1778.	The 13th Year's Expence,	2 12 2 $\frac{3}{4}$
1779.	The 14th Year's Expence,	2 12 2 $\frac{3}{4}$
		37 4 1 $\frac{1}{2}$
	To clear Profit in 14 Years, *	90 13 5 $\frac{1}{2}$
		127 17 7

This Sum of 90*l.* 13*s.* 5*d.* $\frac{1}{2}$, being obtained in fourteen Years, amounts to 6*l.* 9*s.* 6*d.* $\frac{1}{4}$ per Annum, clear Profit upon an Acre of Ground, under this Culture.

Per

* I am obliged to close the Drill Account at the End of fourteen Years, because the common Husbandry is not charged with first Year's Fallow, which Advantage it gained by the Land being under the Drill Culture before. See Report 1765, p. 52, and therefore the Account must close at the End of fourteen Years, that Crop being Oats.

Per Contra,

Cr-

		<i>l. s. d.</i>
1766.	By the 1st Year's Produce. See Page 26,	12 16 7
1767.	By the 2d ditto, *	8 17 0
1768.	By the 3d ditto,	8 17 0
1769.	By the 4th ditto,	8 17 0
1770.	By the 5th ditto,	8 17 0
1771.	By the 6th ditto,	8 17 0
1772.	By the 7th ditto,	8 17 0
1773.	By the 8th ditto,	8 17 0
1774.	By the 9th ditto,	8 17 0
1775.	By the 10th ditto,	8 17 0
1776.	By the 11th ditto,	8 17 0
1777.	By the 12th ditto,	8 17 0
1778.	By the 13th ditto,	8 17 0
1779.	By the 14th ditto,	8 17 0
		<hr/>
		127 17 7
		<hr/>

Dr.

* I include the Straw in this Sum, at three Shillings a Load, supposing it to be only nine Load, see p. 11. credit Side, where it was near ten Load. But the Wetness of last Year contributed to an Increase of Straw. In my comparative Account last Year, I did not value the Straw, as I could form no Judgment of the Quantity, I never having weighed the Produce of an Acre before.

Experiments on Wheat.

Dr. One Acre of Land under the common Husbandry for 14 Years.

	l. s. d.
1765. First preparing of the Ground and sowing Octob. 5. with Wheat, p. 28,	— 2 10 0
Succeeding Charges, see p. 28,	— 1 11 8
	<u>—</u>
1766. First Year's Expence,*	4 1 8
1767. The second Year's Expence for Oats.	l. s. d.
Once Plowing for Oats, †	0 10 4
Harrowing ditto,	0 4 6
Seed Oats two Barrels, §	1 0 0
Sowing, 8d. Reaping, 5s. Thrashing and Winnowing 14 Bar. 7s. 0 12 8	—
One Year's Rent,	0 18 0
	<u>—</u>
1768 and The Expence on a Wheat Crop the 3d and 1769. 4th Years.	3 5 6
See Report 1765, p. 55,	l. s. d.
Reaping, Thrashing, &c. See p. 20.	0 13 8
	<u>—</u>
1770. The 5th Year Expence on Oat Crop, †	6 0 8
1771 and The 6th and 7th Years Expence on a	2 17 6
1772. Wheat Crop,	— —
1773. The 8th Year's Expence on an Oat Crop,	6 0 8
	<u>—</u>
Carried forward,	2 17 6
	<u>—</u>
	The

* Why the Expence was so small the first Year, see Report 1765, p 52.

† In this comparative Calculation I shall charge but once ploughing, 'till our Experiment with the two ploughings, see p. 19, shall be determined.

§ Oats are now ten Shillings a Barrel, and as we have allowed the Market Price for Wheat, we must charge the Market Price for the Seed Oats.

‡ Here I charge but six Shillings a Barrel for the Seed Oats, because the Produce is charged only at the same, and the Wheat at twenty Shillings.

*Per Contra,**Cr.*

		<i>l.</i>	<i>s.</i>	<i>d.</i>
1766.	By the Produce of Wheat and Straw, 1st Year, —	18	2	10
1767.	By 2d Year's Produce in Oats, 14 Barrels, —	4	4	0
	Straw 5 Load, computed,	0	15	0
1769.	By Produce 4th Year in Wheat 10 Barrels, Straw 10 Load, —	4	19	0
1770.	By Produce 5th Year in Oats, —	11	10	0
1772.	By Produce 7th Year in Wheat, —	11	10	0
1773.	By Produce 8th Year in Oats, —	4	19	0
1775.	By Produce 10th Year in Wheat, —	11	10	0
1776.	By Produce 11th Year in Oats, —	4	19	0
1778.	By Produce 13th Year in Wheat, —	11	10	0
1779.	By Produce 14th Year in Oats, —	4	19	0
	Carried forward,	88	17	10

C

Brought

Dr. One Acre of Land under the common Husbandry for 14 Years.

		l.	s.	d.
Brought forward,	—	25	3	6
1774 and The 9th and 10th Years Expence on a				
1775. Wheat Crop,	—	6	0	8
1776. The 11th Year's Expence on an Oat Crop,	2	17	6	
1777 and The 12th and 13th Years Expence on a				
1778. Wheat Crop,	—	6	0	8
1779. The 14th Year's Expence on an Oat Crop,	2	17	6	
To clear Profit in 14 Years,		42	19	10
		45	18	0
		<hr/>		
		88	17	10

Per

*Per Contra;**Cr.*

Brought forward,	—	l.	s.	d.
		88	17	10

C 2

The

Profits of the two Me- thods, for 14 Years, compared.	The Profit arising in fourteen Years from the two Acres of Land in question, compared.
	Clear Profit arising from one Acre in 14 Years, under Wheat in Drills, 90 13 5½
	Clear Profit arising in 14 Years from one Acre, under the Common Husbandry, 45 18 0
	Superior Profit in Favour of the Drilled, 44 15 5½

Consequences Here is a superior Profit, which I think must be interesting to every Man who follows Tillage; and as it is supported by incontestible Facts, so far as our Experiment has gone, and from the Reasons already given, carries the strongest Probability of at least making up the Account as stated, if it shall not greatly exceed it: I trust it will induce Gentlemen of landed Estate, to encourage and instruct their Tenants in a Culture, which promises such Advantages to themselves, their Tenants and the Publick.

As I stated the Account last Year, there was upon the Presumptive Calculation, a superior Profit, of only 24*l.* 4*s.* 9*d.* in favour of the Drill Culture in fifteen Years. Here we see it amounts to 44*l.* 15*s.* 5*d.* $\frac{1}{2}$ in fourteen Years, when we are better furnished with Experience.

Here is a Sum, which in fourteen Years would purchase the two Acres of Land for the farmer, within a Trifle of twenty-five Years Purchase, valuing the Rent at eighteen Shillings an Acre, after leaving a neat Profit for him to live upon, of 4*l.* 17*s.* 7*d.* which is as much as he can gain in that Time by the common Husbandry, supposing him always to have a Produce of ten Barrels of Wheat, and fourteen Barrels of Oats from an Acre.

**Fee of the
Land lost in
under the
Common
Husbandry.** Hence I think we may safely conclude, that in every seven Years, seven Years, the Fee-simple of the *improved* Lands of Ireland, which are under the common Tillage, is lost

lost to the Community, valuing the Land at eighteen Shillings an Acre.

The other Part of the Field which had been prepared in the Year 1764 for Turneps *, was also under Drilled Wheat in the past Year. The Corn is not yet thrashed, but from the Appearance it made, there could be no Difference in the Produce.

Some Observations upon the Author's Crops in general.

The Ground which was described in the Report of 1764 †, to have been manured with Shell Marle, in the Opinion of every Person was equal in quantity to the drilled Acre already described, but in the Colour of the Grain was superior to the Corn arising from the two Acres already described, or any other that I had.

This I think seems to be as strong a Confirmation of the superior Excellence of Shell Marle as a Manure, at least for such harsh Land as mine is, as we can possibly have, and which I before suggested in my Report 1764, p. 45.

That Part of the Ground which was described in the same Report to have been manured with the native Earth, p. 36, produced good Corn, but the Quantity was inferior to the rest.

Upon a Fallow (poor Ground, for a Description of which see Report 1764, p. 39) Part of which I gave a slight Dressing to with Shell Marle. This also produced a plentiful Crop in Drills, and exceeding fine bright Grain.

The other Part of this Fallow was also sown in Drills, without any other Preparation of the Ground than Plowing and Harrowing. The Corn produced from it, was of a bright Colour, but the Quantity we computed, did not exceed four Barrels an Acre.

* See that Report, p. 11 and 12.

† See that Report, p. 35.

Drilling in
the flat Way.

In another Field I sowed an Acre with the Drill Plough in the flat Way, in which I had several Acres sown under the Harrow; but the Land is poor, and the Crop in general was bad; not an Acre in the Whole producing above four Barrels and an half.

Drilling in the flat Way, in my Judgment, cannot answer any material good Purpose, for we cannot introduce the Hoe Plough, or any other Instrument to work by Horses, and to substitute the Spade would be too expensive. And the Corn being sown at equal distant Rows, admits the Weeds to rise in the Intervals with more Luxuriance, than they do in promiscuous sown Corn. These Weeds not being removed, must be attended with a great Diminution of the Crop, and as they must be removed by Hand, or Hand Hoes, for the Reasons before given, the Expence will be too great, to answer any profitable Purpose.

But *above all*, the Ground must undergo the same Preparation in Ploughing and Fallowing, as when under the common Husbandry, and therefore this is a Species of Drill Culture which I cannot recommend to the Practice of any one. I was induced to make a Tryal of it, because I found some Gentlemen were desirous that I should.

To ascertain the Merit or Demerit of this Culture would answer as well, I think, to attempt it on poor, as well as on improved Ground.

And it must be very mortifying to every Man, who knows the Principles of the Drill Culture, to be destroying the Health of Ground already improved, by the Pursuit of any System, which, in a few Years, will effectually do it. The common Husbandry, or any other which disallows the Use of some Kind of *cheap Culture*, during the Growth of the Crop, must have that destructive Effect.

In

In my Report for the Year 1765, I mentioned the having sown several Acres of Wheat, under the Harrow in poor Ground, about six Acres of which received an additional Covering by the Shovel. But no material Difference appeared in the Crop, the Whole having suffered by the Rust; for some Account of which, see my Report 1764, p. 60. I shall just add here, that I observe this Disease to come upon Corn in wet Summers, of which, in dry ones, I have seen no Appearance.

Land sown
under the
Harrow, and
then covered
with the
Shovel.

I shall now Close this Subject for the present, with a few Observations, which I most earnestly recommend to the Practice of the Farmer, be the Mode of Culture what it may, which he shall pursue; because the Prosperity of himself and his Family, and the Bread of the Publick depends upon it.

Some gene-
ral Obser-
vations on the
sowing
Wheat.

Let him by all Means break his Fallow as soon after Harvest as may be, and abolish the unprofitable and ridiculous Practice of deferring it till after *Christmas*, for by the latter, his Land can never be properly prepared; the Way to effect the former, is not to attempt more than his Strength is able to accomplish in due Time. This will naturally lead him to the other important Article which is to fill his Barns, and add Weight to his Purse; namely that, of making it a Point to get his Wheat in Ground before the Expiration of *September*, and that more particularly when the Land is naturally wet, instead of being watching from Day to Day in the later Months, to catch an Opportunity, now and then to sow an Acre; unreasonably depending upon an Indulgence in the later Season. And it is from my own Experience that I offer this Practice, because I have sustained very great Losses by falling into the same Error. And I have known many Instances, where Farmers have been obliged to plough up their Wheat Land in the Spring, and sow it with Oats.

Again, let it be observed, that the poorest Ground should always be sown first, because that must Effect by gaining Time, what the better land will Effect, in a shorter

Experiments on Wheat.

shorter Time, by its being more replete with Food for Vegetables.

And where the Land shall be wet, I am fully persuaded from Experience, that the saving one or two Shillings an Acre in water-cutting of it, is frequently attended with a Loss of as many Pounds. And therefore I earnestly recommend the judicious Execution of that Article to the close Attention of the Master's Eye. I have not a Doubt, but that my having put myself to about Ten Pounds Expence last Year, will make a Difference to me of an Hundred Pounds this Year, in the Corn I now have upon my Land. And with Respect to the other Articles, of early breaking the Fallow, and early sowing, altho' the Land be poor, yet the Strength and Vigor of the Corn, gives as strong a Confirmation of the happy Consequences of those Practices, as can possibly be imagined.

Quantity of
Seed lessened,
and some
Observations
on sowing
under the
Plough, with
Amend-
ments pro-
posed.

I have the Pleasure now to find, that it begins to be pretty generally the established Opinion amongst Men of Sense, that great Quantities of Seed have been, and I am sorry to say, are yet thrown away in the sowing of Land: however, many have adopted the Recommendation of using less Seed,* and in Order to avoid the covering or rather burying the Seed, when sown under the Plough, which is almost unavoidable by the Position of the Mould-board of the Common Plough, I have recommended to such as have applied to me on the first Point, a Plough for Two Horses, to work one before the other, for Reasons I shall name presently. The Board of this Plough is constructed in such Manner, as to moulder the Earth lightly and kindly over the Corn, at the same Time, that it never carries any Load upon it, as is the Case of the Common Plough, the latter of which, for that Reason, the Ploughman is every now and then obliged to shake manfully, in Order to dislumber it from that Load, which is often left in a large Heap. Besides this, he is continually scraping with his Paddle to clean the Board. The Make of the Plough, added

* See Hints on Husbandry, in a Letter to the Dublin Society.

Experiments on Wheat.

41

added to the Load obliges him to throw too great a Quantity of Earth over the Corn, so that I am pretty well assured, not Half of it can grow.*

These Common Ploughs are also drawn by Four Cattle in Couples. The Ridges are of Six Sods, and consequently two of the Cattle, walk Four Times upon the ploughed Part of the Ridge before the same is finished, and *after the Seed is sown*, as if the Farmer wished to temper the Ground like Brick Clay, or to harden and consolidate it, to prevent the Corn ever rising in it; and which he will most effectually accomplish, if the Ground happens in any Degree, to exceed a proper State of Moisture,† and then often expresses Surprize that his Crop is bad.

To avoid this Inconvenience it is, that I make the Seeding Plough already mentioned, so that the Cattle shall draw *single*, and *not double*, by which Means they always Walk in the Furrow, and never upon the Ground after it is ploughed.

Such Persons as have adopted the Use of these Ploughs, sow but Ten Stone of Seed to the Acre, and find their Ground abundantly stocked with Plants.

A Gentleman near me sowed Thirty Acres in this Way last Year, and he tells me he thinks there is too great a Stock upon the Ground.

Tri-

* I have made a large set of Experiments by sowing Wheat at different Depths, in friable, well prepared Soil, and I found the Grains sown deeper than six Inches did not answer, from two to four succeeded best. How much more dangerous must deeply burying the corn be in strong Ground, not well reduced, is plain.

† At the same Time that I totally disapprove of Cattle being yoked in Couples, for covering Corn with the Plough; yet in the more laborious Work of making Fallow, I on the Contrary, as highly Approve of that Manner, because four good Cattle are few enough, properly and effectually to manufacture a Piece of Ground, unless it be a sandy Soil, and also, because the Cattle yoked in that Manner, are nigher the Resistance, and consequently have the greater Power.

Experiments on Wheat.

Trifling Savings in this Kind of Husbandry are of Importance, and therefore will be universally allowed, to be worthy of Notice, tho' in our Calculations upon the Drill Culture, we must not venture to go so close, least we should be really thought enthusiastically " Drill " Mad."

I think it was pretty clearly shewn in last Year's Report, p. 50, that to sow an Acre of Wheat under the Plough would require Eight Cattle in a Day; with these Ploughs an Acre will be sown with Four Cattle. The saving upon the 30 Acres already named, valuing the Cattle at One Shilling a-piece, will Amount to Six Pounds. But when we add the Saving of 15 Barrels of Seed, valuing it at only 20 Shillings a Barrel, we see that Saving, and the Cattle, Amounts to 21*l.* This Sum would probably pay the Rent.

So that whoever chooses to pursue the Common Husbandry, I recommend to their Consideration and Practice, this Method, in the Pursuit of which they will certainly find additional Profits.

But I hope to shew a Probability of yet greater Savings, even in that Husbandry, because I think, where Ground shall be well reduced for the Reception of Wheat, that it may be well and sufficiently covered with one Horse in a Plough; but I shall not Venture to recommend this Method, until I have put it in Practice myself, which I intend to do in a pretty large Way, next Season.

Expe.

Experiments on Lucerne.

The Experiments on Lucerne, which I mentioned in my two former Reports, produced this Year in the following Proportions. In describing the Produce, I shall continue the respective Numbers which I made Use of in my former Reports.

Nº. 15. One Perch in Drills 3 Feet asunder.

	C.	Q.	lb.
1st. Cutting, <i>May 28</i> produced	1	0	13
2d. Cutting, <i>July 14</i>	1	0	3
3d. Cutting, <i>August 10</i>	1	0	5
4th. Cutting, <i>October 9</i>	0	3	15
	—	—	—
	4	0	8
	—	—	—

Nº. 16. One Perch in Drills 2 Feet asunder.

	C.	Q.	lb.
1st. Cutting, <i>May 28</i> produced	1	0	2
2d. Cutting, <i>July 14</i>	0	3	21
3d. Cutting, <i>August 10</i>	0	3	22
4th. Cutting, <i>October 9</i>	0	3	4
	—	—	—
	3	2	21
	—	—	—

Nº. 17. One Perch in Drills One Foot asunder.

	C.	Q.	lb.
1st. Cutting, <i>May 28</i> produced	1	1	0
2d. Cutting, <i>July 14</i>	0	3	20
3d. Cutting, <i>August 10</i>	0	3	17
4th. Cutting, <i>October 9</i>	0	2	26
	—	—	—
	3	3	7
	—	—	—

Experiments on Lucerne.

Nº. 18. One Perch in Broad-Cast.

	C.	Q.	lb.
1st. Cutting, <i>May 28</i> produced	1	1	0
<i>July 14</i> not fit to cut	0	0	0
2d. Cutting, <i>August 10</i>	0	3	2
<i>October 9</i> , no Growth	0	0	0
	—	—	—
	2	0	2
	—	—	—

One Perch transplanted 28th of *April 1764*, and was
that which I mentioned in my two former Reports.

1st. Cutting, <i>May 28</i> produced	1	0	26
2d. Cutting, <i>July 14</i>	1	0	11
3d. Cutting, <i>August 10</i>	1	0	14
4th. Cutting, <i>October 9</i>	0	3	20
	—	—	—
	4	1	15
	—	—	—

I shall now Restate the Produce of these different Experiments in one View, and Calculate the whole to an acreable Produce, by which we shall at once be able to form a conclusive Judgment of the different Methods of Culture.

	T.	C.	Q.	lb.
Nº. 15. In Drills with Intervals of <i>three Feet</i> , produced at four Cuttings during the Summer of the 3d Year 4 Hundred Weight and 8 Pounds, which upon a Plantation Acre of equal Quality would Amount to	32	0	2	24

Nº. 16. In Drills with Intervals of <i>two</i> <i>Feet</i> , produced on one Perch, at four Cuttings during the Summer of the 3d Year 3 Hundred, 2 Quarters, 21 Pounds, which upon a Plantation Acre of equal Quality would a- mount to	29	10	0	0
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T. C. Q. lbs.

N^o. 17. In Drills with Intervals of *one* Foot, produced on one Perch, at four Cuttings during the Summer of the 3d Year 3 Hundred, 3 Quarters and 7 Pounds, which upon a Plantation Acre of equal Quality would Amount to

31 0 0 0

N^o. 18. In Broad Cast, yielding only two Cuttings during the Summer of the 3d Year, one Perch produced 2 Hundred Weight and 2 Pounds, which upon a Plantation Acre of equal Quality would Amount to

16 2 3 8

One Perch of transplanted Lucerne with Intervals of three Feet, produced at four Cuttings during the Summer of the 3d Year 4 Hundred, 1 Quarter and 15 Pounds, which upon an Acre of equal Quality, would Amount to

34 12 2 0

As the Produce of these Experiments in the past Season, which was the third Year since putting them down, renders the Experiments decisive, as to which Method is to be preferred in the Culture of Lucerne, I intend to close this Set of Experiments, with this Report, because that sown in the Broad Cast Way is now past all Recovery, and therefore, *so far as that Method is concerned*, it would be needless to pursue the comparative Experiment any farther.

But as this Report may fall into Hands which are not possessed of my former Reports; and to render the Conclusion ready to every Reader, without the Trouble of referring to the former Years, I shall now State the Quantity produced by each Method in three Years, and draw my Conclusions, and make some *general Observations* and Calculations upon this inestimable Plant.

Experiments on Lucerne.

Nº. 15. The Produce, with Intervals of *three Feet*, for the three first Years.

	T.	C.	Q.	fl.
1st Year, 1764, the acreable Produce	2	4	2	16
2d Year, 1765 *	8	17	0	16
3d Year, 1766 †	32	0	2	24
	43	2	2	0

Nº. 16. The Produce, with Intervals of *two Feet*, for the three first Years.

	T.	C.	Q.	fl.
1st Year, 1764, the acreable Produce	3	3	2	8
2d Year, 1765	9	10	0	0
3d Year, 1766	29	10	0	0
	42	3	2	8

Nº. 17. The Produce, with Intervals of *one Foot*, for the three first Years.

	T.	C.	Q.	fl.
1st Year, 1764, the acreable Produce	2	12	2	0
2d Year, 1765	8	17	0	16
3d Year, 1766	31	0	0	0
	42	9	2	16

Nº. 18. The Produce of the broad Cast for the three first Years.

	T.	C.	Q.	fl.
1st Year, 1764, the acreable Produce	4	4	1	4
2d Year, 1765	8	2	3	12
3d Year, 1766	16	2	3	8
	28	9	3	24

* Be it remembered, that this was in the remarkable dry Summer. See Report 1765, p. 25, where I mentioned the Lucerne to have been affected by it.

† This was a remarkable wet Summer.

The Produce from the transplanted in the second and third Years.

1 Year, 1764, not cut by an Accident.

See Report 1764.

2d Year, 1765, the acreable Produce

3d Year, 1766

T. C. Q. lbs.

10 12 3 12

34 12 2 0

45 5 1 12

Here we see, every year since the putting down these Experiments, how the Produce has progressively increased in all those which are in Drills, and how far that in the broad Cast is behind them in Quantity *, although that has increased also in Point of Produce; but yet we see, although it produced near double the Quantity of any of the rest in the first Year, that in the third Year it has produced only about half as much as any of the rest; the drilled in the third Year 15 Times as much as it did the first Year, and the broad Cast only about four Times as much as in the first Year, and upon the gross Produce in three Years, is 16 Tons, 15 Hundred, 1 Quarter, and 16 Pounds short of the transplanted. The latter has also considerably exceeded all the rest which was sown in Drills, although it has not Credit for the Produce of the first Year.

We can scarcely have a stronger Proof of the Merit of that ingenious *Drill Farmer*, M. *De Chateau Vieux*, whose Invention it was to cultivate this valuable Plant by Transplantation.

As from this Set of Experiments, the most profitable Method of raising Lucerne appears to be by transplanting of it, I now have the pleasure of having it in my Power to report the Effect of an Experiment, in which it may be remembered I was disappointed the two first Years †, where I had transplanted the Roots of Lucerne

* See Report 1764, p. 84, 85, and 106.

† See Report 1764, p. 91.

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of different Sizes, to see which answered best, and also by trimming some of each Size, and putting down some of the same Sizes, without trimming, in order to discover how the Plants might be affected by the Amputation of the Roots. See Report 1764, p. 92.

	lb. oz.
Nº. 1. Forty of the smallest Plants, which had their Tap or leading Root cut off, produced at one Cutting	19 6
Nº. 2. Forty of the middling-sized Plants, which had their Tap or leading Root cut off	20 0
Nº. 3. Forty of the largest Plants, which also had their Tap or leading Roots cut off	22 8
	<hr/>
	61 14
	<hr/>
Nº. 4. Forty of the middling-sized Plants, without cutting their Roots, produced at one Cutting	21 4
Nº. 5. Forty of the largest Plants, without cutting their Roots	15 10
Nº. 6. Forty of the smallest Plants, without cutting their Roots	15 5
	<hr/>
	52 3

Here we see that the largest Plants, No. 3, which underwent the Amputation, afforded a larger Produce than any of the rest, and consequently, in laying out a Plantation of this Kind, they are to be preferred. But let it not be forgotten, that the Plants were only one Year old. See Report 1764, p. 92.

No. 5, which were of the same Size, and put down whole, were very deficient in Point of Produce, when compared with No. 3, and greatly inferior to No. 1. and No. 2.

How

How it happens that No. 4. produced more than No. 2, which were of the same Size, I cannot take upon me to say; however, I think notwithstanding that, the Point seems to be decisive in Favour of pruning the Roots, because, when we compare the Produce of the 120 Plants which underwent the Amputation, with that of the 120 which did not, we see, upon the gross Amount, that the first exceeded the other, in Point of Produce, nine Pounds and eleven Ounces, which is above an Ounce and a Quarter more from every Plant than those produced which were not trimmed. This Difference, upon an Acre, would amount to 32 Hundred, 3 Quarters, and 7 Pounds, an Acre containing 47040 Plants. See Report 1765, p. 24.

It being now proved, that Lucerne will produce the largest Crop by being transplanted, it seems to be no small Happiness in this, the best Culture of it, that pruning the Roots contributes to its greater Produce, because it is very troublesome to transplant without pruning. See Report 1765, p. 13. And for some Reasons why pruning the Roots contributes to the Vigour of the Plants, see the same Report, p. 14.

I was so convinced last Year, when I came to look over my Minutes for making my Report, of transplanting being the superior Culture for Lucerne, that I did, in the Month of *March*, transplant about Half an Acre in one of my Fields, which afforded three Cuttings last Summer, which indeed was more than I expected. The rows are 649 Feet long, one of which I cut by itself, and the Produce at the first Cutting, *July* the 2d, was 2 Quarters and 26 Pounds; *August* the 2d the same Row afforded 1 Hundred, 1 Quarter, and 3 Pounds; and on the 7th of *October* the same Row afforded 1 Hundred Weight and 14 Pounds; which three Cuttings together, was in the Proportion of 5 Tons, 13 Hundred, 2 Quarters and 8 Pounds to a Plantation Acre.

In my Report for the Year 1764, I mentioned, that some Lucerne which I had sown a Year before, was, on the first of *May*, eighteen Inches high, at the same

D

Time

Experiments on Lucerne.

Time observing, that it had the Benefit of a South Aspect, aided by the Reflection of a Fruit-Wall. Adding, that from thence I was induced to believe, that a Declivity, with a South Aspect, would be the most advantageous Situation for this Plant in this Country; for although Lucerne will live through the severest Winters, yet it flourishes best under the Influence of a warm Sun.

I now have the Pleasure to see this Observation confirmed, because the last-mentioned Field, in which I transplanted the Half Acre, inclines to the South-east, with an open Exposure; whereas, the Experiments already mentioned are not so circumstanced, but on the contrary, are in some Measure, shaded from the South.

To the Aspect of this Field, its open Exposure, and the Wetness of the Summer, I attribute the third Cutting, which I obtained in the Summer immediately following the putting down the Plants: and it still further confirms the Advantage and Prudence of choosing such a Situation, because the Lucerne in the Field is now at this Hour, *i. e.* the 27th of March, from ten to fourteen Inches high; whereas, the most forward Growth of the former Experiments does not amount to six Inches; and of the two, I think the Ground in the Field must be the inferior,

It being now pretty fully proved, I think, that the best Culture for this Plant is not only by Transplantation, but also that the Plants should all have their leading Roots cut off, from four to six Inches below the Crown of the Plant. It may perhaps be expected, that I should give some Estimate of the Expence attending the Culture in this Way, which I shall now endeavour to do.

To transplant an Acre in Rows three Feet asunder, and the Plants six Inches in the Rows, will cost about 38 Shillings and Six-pence, the Wages of the Men being at 8*d.* a Day, and will take 47040 Plants.

The

The Horse-hoeing will cost about one Shilling and Nine-pence an Acre each Time *, and I think Lucerne should be horse-hoed at least five Times in a Season, six might be better, and therefore I shall state it so.

What the weeding will cost is hard to say, because it depends so much upon Seasons, and the due Preparation of the Land. But I think if it is charged at five Shillings an Acre, it will be as much as it can amount to one Year with another.

To keep a Lucerne Plantation in the best Order, and to make no Waste in it, the best Method will be to reap the Crops as we do Corn, because mowing cannot be so conveniently performed; it will scatter the Gras, neither can it be cut so regularly as with an Hook. I apprehend the reaping will cost about four Shillings an Acre at each Crop, which I shall calculate only at four, though in a well-prepared Plantation, I believe, they will amount to five; however, at four the Expence of this Article will amount to sixteen Shillings in every Season.

The transplanting being only the first Expence, I shall not state that in the annual Expence.

* Upon the first View, it may appear extraordinary to some Readers, that the Horse-hoeing an Acre of Lucerne should cost 1*s.* 9*d.* when it has been already stated, that an Acre of Wheat will cost only 1*s.* 7*d.* and sometimes less. But let it be remembered, that the Intervals between the Lucerne are only three Feet, between Wheat above four, and the Plough goes as often in an Interval of Lucerne as it does in an Interval of Wheat; and consequently there are more Furrows in an Acre of Lucerne than an Acre of Wheat.

Annual Expence upon an Acre of transplanted Lucerne.

	l. s. d.
Six Times Horse-hoeing, at 1 s. 9 d. a Time	0 10 6
Weeding for the Season	0 5 0
Reaping four Crops	0 16 0
One Year's Rent	0 18 0
	<hr/>
	2 9 6

We have already seen, that in the third Year, an Acre of transplanted Lucerne will produce 34 Tons, 12 Hundred, and 2 Quarters. It appears, indeed, that in a Situation better adapted to it; than that from which we ascertain our Quantity, more may be expected; but in our present Calculation, we shall take no further Notice of that.

In my Report for the Year 1764, p. 94, it may be remembered, that I made an Experiment, by putting fifty-six Pounds of Lucerne before an hungry Horse, of which he had eaten, in the Course of one Night, forty-nine Pounds. My Calculation, upon this Consumption, was upon a Presumption, that an Acre should produce only sixteen Tons in a Summer; and that supposing an Horse should eat forty-nine Pounds every Day, at that Rate an Acre, producing only sixteen Tons, would maintain five Horses twenty Weeks and six Days.

I am the happier in that Experiment and presumptive Calculation for two Reasons; first, because I find a late very learned Writer, and laborious Experimenter in the Culture of this Plant * says, " Two good Cart or " Coach Horses will consume near eighty Pounds " Weight of green Food (Lucerne) in a Day and " Night, with some dry Food besides;" and secondly, because I find I greatly under-rated the Produce of an Acre, in supposing it to be only about sixteen Tons, since in the past Year, it appears to have been more than

* Author of the Essays on Husbandry, p. 125, Essay 2d.
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than double that Quantity, namely, 34 Tons, 12 Hundred, and 2 Quarters, *i. e.* 77,504 Pounds.

Now suppose, that what an Horse shall eat, and Servants shall waste, should amount to 56 Pounds in twenty-four Hours, instead of forty-nine; at that Rate, our Quantity would maintain ten Horses 138 Days, with an Allowance of two hundred Weight for Waste in the Grofs.

If we value the maintaining an Horse 24 Hours at only 4*d.*, the Amount will be 23*l.* If at 5*d.* the Amount will be 28*l.* 15*s.* But how many are there, who would gladly give 6*d.* a Day for their Horses being fed with Lucerne? which would amount to a much larger Sum, *i. e.* 34*l.* 10*s.* Or how many Gentlemen and Tradesmen are there in *Dublin*, or other Towns, who would gladly give from 12*d.* to 18*d.* an Hundred for this Gras, to feed their Horses in the Stable.

But let us examine this Matter in another Point of View, with respect to the Farmer, because it appears to be a Matter of the greatest Consequence to him, and consequently the Public are very materially interested in it, and therefore it merits the closest Examination and Attention.

It will hardly be supposed, I apprehend, that a Cow will eat more than a large working Horse. It will remain a Doubt with me, whether she can eat as much, till my Materials are ripe for determining the Question, which I shall be anxious to ascertain for many Reasons.

But let us, for the present, suppose she will eat and waste fifty-six Pounds of Lucerne in twenty-four Hours. In that Case, the Quantity before-named will maintain ten cows an hundred and thirty-eight Days, *i. e.* nineteen Weeks and 5 Days in the Summer. Suppose twenty Calves to be put upon the ten Cows; thus they may be well raised till *Michaelmas*, not that there is a Necessity for their sucking so long, and that then they

Experiments on Lucerne.

shall be wintered upon Hay, Turneps, and Turnep-Cabbage.

In the *May* following, suppose the twenty Calves should sell for fifty Shillings a Piece, that would amount to $50l.$ Might we not reasonably credit the Summer keeping of them at half the Price they would sell for? So that our Acre of Lucerne, at this Rate, would produce $25l.$ out of which the Expence of Culture, &c. is to be deducted. But suppose we value the Summer keeping at only $\frac{2}{3}$ of the Price of the Calves, in that Case the Sum would be $20l.$ out of which we are to deduct the Expence, i.e. $2l. 9s. 6d.$ which would leave the neat Profit, $17l. 10s. 6d.$ for an Acre of Lucerne. But suppose the Expence double, the Profit even then would be $15l. 1s.$

It will hardly be apprehended, that in valuing the Calves at $50s.$ a-piece, I mean they should be of an ordinary Kind; and if they were of a superior Kind, they would bring a much larger Sum. I myself have refused $3l.$ and $4l.$ an Head for yearling Calves since I settled here: so that it is plain I have greatly underrated the Profits which might arise from a Plan of this Kind being carefully and judiciously executed.

I have ever found, in my Experience of Mankind, that no Method is so effectually persuasive, be the Matter what it may, which is to be recommended to the Practice and Attention of the Public, or even to that of the dearest Friend, as to appeal to the Passions,

Whilst Barbarism over-run the Earth, the savage Pride was gratified by an Acquisition of Beads, Shells, and Colours; but since Commerce reared her Head, the almost universal Passion of human Nature seems to be a Love of Gain, because that gain will gratify our Group of Passions, which spring from Pride.

For this Reason it is, that in the Course of my Enquiries into what the Surface of the Earth is capable of affording us, that I have hitherto adhered to the Method of shewing it by stated Accounts of Profit and Loss,

without entering minutely into the systematic Principles which guide my Pursuits.

To begin with the latter would be unintelligible to the Generality of Farmers, and therefore it cannot be expected that they would pay any Attention to what might be urged; but shew their Gain, without confounding them with first Principles, and they listen with Attention: That is to be followed by rendering the Practice as easy as may be, and the Principles, in Part, will naturally follow to their Comprehension.

But inviting as these Profits must appear to every Reader, let no Man flatter himself with the Hope of gaining them by the slovenly and inconsistent Practice of the common Modes of pursuing Agriculture. Neither must he expect them, by beginning in the Method here recommended, if he afterwards shall become negligent, because that will overset the whole System, and disappoint his Expectations.

At present I shall defer entering upon the Principles of this Culture to some future Day, and confine myself to a Description of the Practice; and therefore I say, whoever wishes to have a successful Plantation of Lucerne, must strictly observe the following Rules and Methods, unless from Practice he shall devise better.

First let a Piece of Ground be chosen, which is perfectly dry, and if it inclines to the South, it will be an Advantage. If the Soil be deep, so much the better; but if shallow, and Stone or Gravel be under it, let the Cultivator be not discouraged, Success will be had notwithstanding, although it be near the Surface; but if a stiff and hungry Clay be below, so as to hold the Water, such Ground will as certainly not answer, longer than till the Roots approach the Wet, when they will immediately rot, and the Plants will perish.

The proper Ground being chosen, let it be well and deeply broken up in the Month of October, and if necessary, effectually water-cut, to prevent the Rains of the Winter lying in the Furrows, or any other Part of

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it. Early in the following Spring harrowed, and again immediately ploughed. In *April* again harrowed and ploughed. In *May* harrowed, and then well and highly manured with Dung or Compost. See Report 1764 and 1765. After this, let the Manure be ploughed in as soon as possible. In *June* let the whole Piece so prepared be ploughed into Ridges five Feet broad, and sown with Turneps in Drills, and regularly horse-hoed, See Report 1764. It may not be improper here to observe, that the Reason I recommend Turneps to precede the Lucern Plantation is, that there is no Crop which destroys Couch Grass and other Weeds equal to drilled Turneps, or drilled Rape.

When this Crop is off the Land, let the Ground be ploughed and harrowed till it be well reduced, and laid as flat as possible, and as early as may be in the Spring; but on no Account suffer it to be touched if wet with Rain, but wait until it be moderately dry. After it is thus harrowed, and laid as flat as may be, then let the whole Ground be thrown into Ridges of three Feet, which will be compleatly done by two Furrows of a Plough gathering the Ground, i. e. throwing one Sod against the other.

Whoever embarks in this Culture, will of Course have taken Care to sow his Lucerne before, so as to have the Plants at least a Year old, by the Time his Ground shall be ready.

All Things being thus prepared, let the Plants be taken up carefully out of the Nursery, and the leading Roots cut off within four, five, or six Inches of the Crown of the Roots, in Proportion as the Sizes of the Plants will admit of it without Fear; and immediately after lightly raking the Tops of the Ridges, let the Plants be put down, one Row along the Middle of each Ridge, and the Plants about six Inches asunder in the Rows.

From the Middle of *September* to the Middle of *October* this Work may be done, if the Cultivator shall choose to clear the Land of the Turneps at that Time;

but

but if not, he may begin in the Middle of *February*, and continue planting until *April*, or even *May*, but that is full late.

For the performing this work of putting down the Plants at the least Expence, let it be done in or immediately after Rain, although it be very cold, for that, my Experience hath shewn, will not injure the Plants.

During the first Summer, let the Plants be approached by the Hoe-plough and Cultivator with Care and Tenderness, because they cannot be supposed to have got very firm Hold of the Ground in so short a Time, and without this Caution they might otherwise be displaced.

Any Weeds which may appear immediately in the Rows, during *that Summer*, must be carefully and cautiously taken out by Hand and little weeding Knives.

In the Month of *October*, when the Lucerne shall cease growing, let the Hoe-plough pass within about three Inches of the Plants on each Side, throwing the Sod from the Plants; by which Means a small Ridge of Earth will be left in every Interval or Space. In this State the whole is to be left until the Plants begin to shoot in the following Spring, which will be early or late, in Proportion to the Coldness or Mildness of the Weather, Richness or Poverty of the Ground. Whenever that is seen, or before, if the Weather be dry, let the single Cultivator pass as near the Plants, and as deep as may be on both Sides the Rows, always remembering, that the *Pin* of the Sock is to work from the Plants in the Passage of the Instrument.

This being done, let the double Cultivator be run up the Middle of one Interval, and down the other, and so on, until the whole be finished.

If after these Operations (or at any future Time) during the Summer, there shall appear any natural Grass, or other Weeds, immediately in the Rows, which will now stand upon a Ridge of not above four

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or five Inches, let a three-pronged Fork, with *round Prongs*, be put into the Hand of a careful Man, with Directions to raise all the Weeds up by the Roots, which he will do with the greatest Ease imaginable, without Injury to the Lucerne, because that will now have got firm Possession of the Ground; and therefore an Hour's Practice will dissipate all Fear, with which the Workman will be intimidated at first. This Work is best and easiest done after Rain.

My Practice used to be, to throw the Weeds into the Intervals; but I have found Inconvenience from that, they having sometimes grown again, which they will certainly do if rain soon follows, so that the Man now has a Wheelbarrow by his Side, in order to carry off the Weeds.

Where tap-rooted Plants, such as Docks, Thistles, Hemlock, Aloes, &c. happen to be *in* the Rows, in getting them up clean, it sometimes will happen, that the Earth will fall *from* the Stem or Trunk of the Lucerne Roots; in that Case, the Man may in a Moment throw up a little Earth with his Hands to the Roots, which leaves all safe.

This radical Weeding being repeated for two or three Years, it is to be imagined, must so diminish the Generation of Weeds in the Plantation, that at length that Trouble will be at least abated, if not in a great Measure saved; but whether that Extirpation of them shall happen or not, whoever omits paying a strict Attention to the removing them when they appear, will as certainly miscarry in his Plantation.

In this State the Plantation may remain, until the Growth is from 4 to eight Inches high; then let the Hoe-plough turn a light Sod to the Rows, taking care not to cover the Plants. And as often as it is cut, or Weeds appear, these Operations are to be repeated.

Every Man who knows the Value and Nature of Lucerne, cannot but very much admire the Order of Nature in the Construction of this Plant, which being kept

free from plundering Neighbours, (Weeds) will afford an incredible Produce; but robust as it is against Cold, it cannot admit of them. How happily then is it framed, to admit of their Removal; for when once it has got firm Possession of the Ground, it is with hard Labour that it can be removed; although to see a Man with the Tool which I have named, and by much the best I could ever devise, digging freely and boldly about the Plants, to remove the Weeds, a Spectator not acquainted with the Plant, would imagine the Workman would certainly destroy every one of them; but even in the second Year after laying out the Plantation, it will not be easy to remove them, how much more that must be the Case, when they advance in Age is plain.

At the same Time that this Operation can be so easily performed in a Plantation of transplanted Lucerne, yet I must not omit to observe, that it is much more difficult to do it in sown Lucerne, although it be in Drills, because in that the Roots stand so close together, that the Instrument will be perpetually entangling with them, which prevents the Workman from so easily raising the Weeds up by the Roots, and therefore the Work goes on but slow, whereas, in the other, it is more expeditious than can be reasonably imagined.

The Crop is thus to remain until it is fit for cutting, to determine which is to be guided, in a great Measure, by the Scarcity or Plenty of Fodder which the Cultivator may or may not have for his Cattle. If the Plantation be but small, in Proportion to the Stock he keeps, in that Case the Crop will go the farther, by letting it stand till the Blossoms just begin to appear. But if the Plantation be large in Proportion to the Stock, in that Case it will be best to begin cutting when the Crop is about eighteen Inches high, otherwise that Part which remains to the last will be hard in the Stems, and therefore not so palatable to the Cattle. But let it be observed, that when it is cut long before blossoming, that it is then soft, to use the Farmer's Expression, *i. e.* very juicy; so that it turns to greatest Profit to cut it when in Blossom, or a little before.

After cutting, let the Hoe-plough be brought in again, yet throwing up more Earth to the Plants, unless Weeds appear upon the Soil, which the Hoe-plough threw up before ; in that Case let the single Cultivator be run in the same Direction as before mentioned. If Weeds should appear after cutting immediately *in the Rows*, let them be removed in the Manner before described.

Thus the Plantation is to go on, always hoeing, cultivating, and weeding, soon after cutting, by which Means the Plantation will be kept free from Weeds, the Soil always in a Garden State, and a Succession of Crops will be afforded every Month during the Summer, in the Proportion of seven, eight, nine, and probably ten Tons of Pasture from an Acre at every cutting. Indeed I think much more may be obtained ; but the whole depends upon the Degree of Improvement which is given to the Ground in the setting out, and the Operations already mentioned being timely and frequently performed.

If the Cultivator, in consideration of the abundant Quantity of Manure which the Plantation will enable him to make every Summer, will be grateful enough to sprinkle a little of it in every alternate Interval every third Year, he will be abundantly repaid by the generous Growth of the Plantation, always observing to sprinkle the Manure in the Intervals which did not receive it before.

Thus I have given only a slight Account of the practical Culture of this inestimable Plant, without saying a Word of the Principles upon which the Method of Culture is built, neither shall I, in the present Performance, enter upon that Part of this important Subject, but shall postpone it as a Matter which I think will give intrinsic Merit to some future Work, at the same Time that it will afford me an Opportunity of expressing my grateful Acknowledgments to the Memory of Mr. *Tull*, and the indefatigable Labours of *M. de Chateau Vieux*.

Although I have only given a short View of the practical Culture of this Plant, yet unbelieving and slovenly Husbandmen, may probably say I have taken up too much of their Time; but if any shall form such Opinion, I can only say, that I shall look upon them with tranquil Pity, and live not without an Hope of seeing, that Men of Sense and Merit will accumulate real and intrinsic Wealth, by following the Directions here offered to their Consideration and Practice; and which, I have the Pleasure to say, I *already* have Reason to expect.

It may very probably be asked, how many Acres of Lucerne I have, which being found not yet to amount to one, may be caught at as a solid Objection. But I shall be allowed to say, which I think carries no Demerit with it, that till now I did not know the best Culture of this Plant; my Experiments have led me to a Knowledge of it, and now I have obtained it, I, with an hearty good Will, offer it to the Practice of Mankind, staking my Credit upon the Success, provided the Directions are adhered to. And so convinced am I of the Emoluments which will arise from it, that I shall introduce it in Quantity, as fast as I can upon my Farm; and in order to gain Time, shall attempt it at such an Expence, as I shall not venture to recommend to the Practice of others.

Much Pains has been taken in *England* to discover green Pasture for Cattle, particularly Ewes and Lambs, in the Months of *March* and *April*. I shall be allowed to say as a farther Recommendation of Lucerne, that in that we have it; but it is plain Mankind did not know the Culture of it, if they had, they would have known that it will afford the finest of all Food, for Ewes and Lambs in the Months of *March* and *April*, and that in great Plenty; because we have already seen, that my *Field Plantation* of it, was on the 27th of *March* last, from ten to fourteen Inches high.

But altho' I have said this, I would not recommend Sheep to be turned into a Lucerne Plantation, unless

Experiments on Sainfoin.

the Distress of the Farmer be insurmountable, because I do not yet know, from my own Experience, what may be the Effect upon the Plants, though I do not at present apprehend any great Danger, provided they are not kept in so long as to eat it down close. If we have a Cow or Cows which calve early, would it not be an happy Circumstance to have such a Resource, as Grass of so nourishing a Nature to cut for their Food, even on the 27th of *March*, which before *May*, would be more than as high again. But in the Course of the ensuing Summer, I shall bend my Attention to the Article of pasturing Cattle with Lucerne, and shall furnish my Observation next Year.

I shall close this Subject, for the present, with one Observation, which I earnestly recommend to the Attention of every Person, who shall embark in the Culture of this Plant; that is, that they do not attempt a larger Plantation at a Time, than they can compleatly and effectually prepare, for the Reception of the Plants.

Experiments on Sainfoin.

In my Report of last Year, I made some mention of this Plant, expressing my Apprehension, that a judicious Culture of it, would afford great Profit to the Farmer. I am now much stronger of that Opinion, but as my Experiments are not ripe for determining the most profitable Culture for it, I shall, for the present, only state the Produce of the past Summer, from the Experiments I mentioned last Year, which are still depending. Indeed I did attempt to extend my Experiments last Summer, I having sown an Acre with my Drill Plough, but in that I was disappointed, not a Grain of it having come up.

I sowed the Year before a small Patch in the broad cast Way, which came up irregularly, from that I collected a little Seed by Hand, which I sowed this Day, i. e. 31st of *March*, 1767. But as I wanted to form a Judgment of the Quantity of Pasture which

Sainfoin

Sainfoin will produce. I could not admit of its standing to ripen the Seed in my other Experiments, and therefore they were cut in the following Order.

One Perch of *sown* Sainfoin in the third Year.

	C. qu. lb.
First cutting June 11th, produced,	2 2 2
Second cutting September 10th,	0 3 17
	<hr/>
	3 1 19
	<hr/>

One Perch producing 3C. 1qu. 19lb. in the same Proportion, an Acre of equal Quality, would produce 27 Tons, 7 Hundred weight, and 16 Pounds.

The Produce of transplanted Sainfoin in the second Year after putting down.

210 Plants produced at the

	C. qu. lb.
First cutting June 11th, —	1 1 21
Second cutting September 10th, —	0 2 7
	<hr/>
	2 0 0
	<hr/>

Two Hundred weight produced from 210 Plants, is above 17 Ounces from each Plant. An Acre will contain 47040, they being put in Rows three Feet asunder, and six Inches in the Rows. Each Plant producing 17 Ounces, an Acre, at that Rate, will yield a Crop of 22 Tons, 6 Hundred and 1 Quarter, in the second Year.

In the succeeding Years, it will certainly produce much more, of which we may rest very well assured, I think, when M. Diancourt says, that "one of his " Plants, and that not the largest in the Field, produced 23 Ounces of Hay," which must have been, at least, six Times my Produce, because mine was weighed green, and his dry.

However, I shall not enter into a further Detail upon this Plant at present, until I can speak more fully of it, from my own Experience, than to say that I think the Quantity which I have already produced is such, as renders the Plant well worthy the Farmers Attention.

But I shall just observe, that if it shall even come up to Lucerne in point of Produce, that it cannot be so valuable, because it affording but two Crops in a Season, it comes too much at once, unless for the Article of Hay, whereas the Lucerne comes in Succession,

Experiments on Burnet.

In my two former Reports, I have taken some Notice of this Plant; but for Reasons therein mentioned, I could form no accurate Judgment of the Produce.

During the past Summer, I was careful to ascertain that Point, which I shall now relate, and which will lead to some Observations I have to make upon the Plant, its Nature and Uses.

I shall continue the same Numbers to each Experiment, as described in my Report for the Year 1764; and the Reader will observe, that the Produce of the last Summer was the *third* Year since the sowing of it.

T. C. Q. £.

N^o. 11. One Perch in the broad Cast, or common Way of sowing, was reaped on the 27th Day of May, which amounted to 3 Hundred Weight and 14 Pounds. An Acre of equal Quality would amount to 25 0 0 0

N^o. 12. One Perch in Drills, one Foot asunder, was reaped on the 27th Day of May, and produced 2 Hundred, 3 Quarters, and 8 Pounds. An Acre of equal Quality would amount to 22 11 1 20

N^o. 13.

N^o. 13.. One Perch in Drills, two Feet T. C. Q. ~~10~~
asunder, was reaped on the 27th Day of
May, which produced 2 Hundred, 1
Quarter, and 7 Pounds. An Acre of
equal Quality would amount to 17 15 0 0

N^o. 14. One Perch in Drills, three Feet asunder, was reaped on the 27th Day of May, and produced 1 Hundred, 3 Quarters, and 27 Pounds. An Acre of equal Quality would amount to 15 18 2 8

In my Report of last Year, p. 13, I mentioned that I had transplanted some Burnet in *March* 1765; the Plants were put down in Rows two Feet asunder, and in the Rows six Inches. On the 27th of *May* 1766, I cut one Perch of this Plantation, which afforded a Crop of 2 Hundred Weight and 14 Pounds. In the same Proportion, an Acre of equal Quality would afford a Crop of 17 Tons.

Thus the Produce arising from the different Methods of Culture appears to the Reader, by which he will see, that which was sown in the broad Cast Way has produced at one Cutting, in the third Year, more than any of that which was sown in Drills. And the narrower the Intervals, so in Proportion the Crop was greater.

This Circumstance I consider as a Point of some Happiness to such Farmers, as have neither Neatness or Inclination to have it in the Culture of their Land; because I observe that this Plant, when once it has got firm Possession of the Ground, is more destructive of Weeds of every Kind, than any other of the whole Tribe of artificial Grasses.

But least even such Farmers should imagine, that they are at once to jump into the Possession of a Crop, which shall at one Cutting afford them twenty-five Tons of Pasture for their Cattle from one Acre of Land ; it is my Duty to premise, that the Ground must be dry,

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it must be ploughed and harrowed until it is reduced to the State of a well-wrought Garden. It must be very highly manured with Dung or Compost *, and the Seed sown the latter End of March or Beginning of April. I shall give my Reasons presently why I name this Season for sowing.

Whilst the Plants are young, they are delicate and tender, and very liable to be destroyed by Weeds and natural Grass; and therefore, during the first Season, great Care must be taken to remove such Enemies, which will be safest done by Hand; for if any Instruments are introduced, many of the Plants will be destroyed thereby; and if this Weeding shall be neglected for the first Summer, the Crop will be diminished, or in Effect destroyed.

The Quantity of Seed to a Plantation Acre, I think, should be from twenty to twenty-five Pounds, and not four Bushels, as a late Writer has recommended, who, it is pretty well known, never had any Experience of the Plant; because, a few Days before he sent his Book to the Press, he called Burnet Sainfoin, when he was in a Plantation of the former.

This Plant is very strongly recommended as a Winter and Spring Pasture for Cattle; and many Disputes have arisen in England, whether Cattle will eat it. I shall first speak as to the pasturing of it, and then as to the other Point.

The first Year I sowed my Burnet, &c. in 1764, I was very anxious to see how it would stand the Winter, as I mentioned in the Report of that Year, (because I confessedly was a Stranger to the Plant) and therefore I did not cut it, but let it run over the Winter, which it stood well, the Frost and Snow having no injurious Effect upon it.

I shall now beg Leave to quote my own Words from my Report of 1764, wrote on the 22d Day of February,

* See Reports 1764 and 1765.

ry, 1765. "I find the broad Cast is a little yellow in
"the lower Fibres, the one Foot Drills the same, only
"in a less Degree; the two Feet Drills are still less
"affected, but the three Feet Drills scarce at all." For the Conclusion drawn see that Report, p. 80. Here we see how the Plants appeared the first Winter, when the Growth of the preceding Summer was small, in Proportion to what we find a greater Age will produce. The second Year it may be remembered, that I let the whole stand for Seed, which was not cut till the Middle of July; and therefore the second Growth of that Summer could not be equal to that which grew in the third Year after the 27th Day of May, on which Day I have already said I cut it. And yet this second Growth was not equal to what I expected, and that was one Reason why I did not cut it; besides which, I apprehended the Excellence of this Plant consisted in Part of the Summer Growth, standing the Winter for early Spring Pasture, which we have found it will do for the first Year, but I find the Case quite otherwise in the succeeding Years, and that from a very natural Reason.

The Head or Crown of the Plant, as it advances in Age, increases in Diameter, by multiplying the smaller Heads which form the great one, see Report 1765, p. 13, and as that lies close to the Ground, the Branches or Growth of the latter End of the Summer, about Christmas, or soon after, fall to the Ground, turn yellow, then black, and decay.

So that whoever depends upon this as an early Spring Pasture for Cattle, must cut it late in the Summer, and depend upon the Winter Growth for the Principal of early Spring Pasture. I wish I could say that is as much as hath been represented by the *warm* Advocates for this Plant; but the Misfortune is, that Men who think they have made any useful Discovery of this Kind, are apt to raise the Expectations of the Publick, too much, by which they the sooner bring their Child (if I may so call it) into Disgrace.

But admitting it would produce in the Winter as great a Quantity of Food as we have been taught to

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expect, there is yet an Objection in the pasturing of it with Cattle, which in my Judgment is so strong, that it Amounts to a Negative upon the Use of it as an early Spring Pasture.

It generally happens at that Season of the Year, that the Ground is wet; we are therefore unwilling to admit our Cattle even into Fields of natural Grass, because we find their Feet are injurious to it, by cutting and sinking Holes in the Soil. The small Heads which I have described to compose the large broad One on a Plant of Burnet, are very delicate, and not only easily wounded, but as easily slipt off. That being the Case (which any Man may in a Moment be convinced of by examining a Plant of two or three Years old) what Danger will it not be exposed to, by the treading of Cattle, at *any Time*, but more particularly when the Moisture of the Ground, admits of their Feet sinking? under these Circumstances, I am very apprehensive, that the Feet of Cattle will not only crush the Head of the Plant, but will also tear and break off the smaller Heads, upon the safety of which seems to depend the increased Quantity of Fodder.

Besides, it has ever been found, that the treading of Cattle upon any Sort of Crop, when the Land is wet, consolidates and kneads the Ground like Doe; for that Reason it is perhaps, that promiscuous sown Sainfoin seldom survives five Years, when it is well known to the judicious Cultivators of that Plant, that it will not only exist, but flourish many Years longer.

Now if the latter Part of the Summer Growth will not stand the Winter, and that the Winter Growth be not sufficient; and that by pasturing upon the Field in the distressing Months, the Plants are liable to be injured, as seems likely to be the Case; it appears likely that Burnet will not fully answer that important Purpose for which it has been so warmly recommended, namely, that of Winter Pasture for Cattle.

However, admitting the Case to be as appears to me from my little Experience of it, the Plant is, nevertheless,

less; a very important one to the farmer; because it is not of that delicate Nature, as to require any extraordinary Care or Attention, after the first Year, in its Culture, because of itself it will prove destructive to Weeds, those conquering Enemies of other Plants. And from the very extraordinary Quantity which a good Preparation of ground suited to it will afford, it perhaps bids the fairest of any of the artificial Grasses to become advantageous to the slovenly Tillers of Land; and therefore I can venture to recommend the Culture of it in the broad Cast Way to such Persons, as a Grass which will afford them great Profit, if they will only dilate their Hearts enough, to prepare their Ground in Manner before-mentioned, and to keep down Weeds for the first Summer,

How far it impoverishes the Ground, how long it will continue to afford such plentiful Crops, or how soon or how often it will require to be supplied with Manure, I cannot from my Experience take upon me to determine. But if it shall require frequent Dressings of Manure in the broad Cast Way, that must be attended with Danger to the Plants by the Wheels of the Carriages employed, and the Feet of the Cattle which draw them, from the same Reasons, that Cattle pasturing will be attended with the like Danger to the Plants.

As to the Point so warmly controverted as it has been in *England*, whether Horses and black Cattle will or will not eat the Produce of this Plant, I own I have been much surprized; because Gentlemen of Credit and Character have asserted, that they will not eat after tasting of it. Others of equal Credit have asserted as strongly, that their Cattle of all Kinds eat greedily of it. And I have lately received a Letter from a Gentleman in *England*, to whom the World is much indebted for his Writings on Agriculture, in which he expresses himself very strongly, in the Recommendation of Burnet as a Food for Cattle of all Kinds; which are fed upon it to great Advantage by a Gentleman in the County of *Surry*, who I understand has a large Plantation of it.

I have given my Burnet when young, when in Blossom, and in Hay; nay, even the Stalks of it, after thrashing the Seed, and all my Horses and black Cattle eat freely of it, except one Plough Bullock, and he refused it all last Summer. For several Weeks my Men took Bundles of it to Town for my Horses, when they have gone for Goods, and they always appeared to eat freely of it; but why this Bullock refused it, I cannot discover.

But it proves, I think, that the Gentlemen in *England*, who have found the Taste of Cattle so diametrically opposite, have spoken truly of their Experience, without Prejudice on the one Side, or Partiality on the other, as hath been too often insinuated.

My Burnet grew upon a small Spot of Ground, and therefore there could be very little, if any, Variation in the Nature of the Soil; and consequently the Dislike of some Cattle to this Food cannot arise from any Effect the Soil may have upon the Plant, as some have apprehended, but from some unknown Cause in the Constitution of the Animal, rejecting some, and admiring other Kinds of Food, as we daily find in the human Creation, even to exceed all Probability of Whim.

The same Case arises in Medicine. I myself have been seized with cold Sweats, and actually fainted away, only by the Smell of the *Spiritus Cocleoria*, or Spirit of Scurvy-Graſs, when many People can and do frequently take it as an Antiscorbutic, without feeling any of those Symptoms.

I can no more account for the Effect of this Medicine on me, than I can for the Dislike some Cattle have to Burnet, neither can any other Man, I believe; and therefore, as the Effect of the one Case seems to be constitutional, may we not pretty safely conclude the same in Cattle, who we daily find are liable to various Disorders; wholesome and unwholesome Habits of Body; some kind in feeding, others which cannot be brought to feed fit for Market; some kind and gentle,

others vicious and ungovernable, shewing, in their Constitutions and Actions, the Caprice incident to Animals of all Species.

Under these Considerations, added to that of the great Produce and easy Culture of this Plant, I think it should be carefully and extensively cultivated.

I am now to give my Reasons, why I prefer the Spring to an Autumn Sowing.

Some Persons have recommended its being sown in *July, August, or September*. From that I ventured to sow some in the Month of *September* in the broad Cast Way; but I had no Success with it, and therefore I was obliged to plough up the Ground again. I have sown it in *June* in Drills, that grew and did very well. But although the Plant is not injured by Cold, when it has acquired some Strength, yet when sown late, the Plants are very tender, and cannot resist the cold Rains of the Winter; whereas, when it is sown in the Spring, before Winter comes on, it acquires such Strength, as to resist every Inclemency of the Weather, except standing Water. For these Reasons I recommend Spring-sowing.

Thus I have spoken of the Culture of this Plant in the broad Cast or common Husbandry, because with me that Method has hitherto produced the greatest Quantity.

But I shall now return to the Culture of this Plant in Drills, and by Transplantation, because I am strongly of Opinion, that those will yet prove to be the most advantageous and cheapest Methods of Culture, and therefore eventually the most profitable; and I am in some Measure bound to enter upon this Part of the Subject, for the Gratification and Assistance of the many Gentlemen and Farmers whom I have the Pleasure to know are embarked, and others upon the Verge of embarking in the Drill Husbandry.

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The Danger which I apprehend will attend the pasturing broad Cast Burnet will never happen to the drilled, because I would not have it pastured at all.

The Burnet in Drills will exist, by the Operation of the Hoe-plough, much longer without the Aid of Manure than the broad Cast can possibly do, because the Soil will be kept loose and free about the Roots of the former, whereas those of the latter will soon be imprisoned by the Soil consolidating about the Roots, abstracted from the Weight of Cattle contributing to it, if they are turned upon it; the Aid of Manure will therefore be the sooner necessary, or the Plantation will sooner diminish than the drilled; and consequently there will be a longer Existence of plentiful Crops in the drill Way, admitting they shall not be so much at a Time as in the common Way, it is natural to imagine will counterbalance, if not eventually exceed the other in Point of Profit. And I shall be allowed to say, that to a neat Farmer, there is no small Degree of Pleasure accompanying Profit, to see a Crop continually rising in Succession, gratefully luxuriant, to the Cultivator's Hand, in orderly Elegance, which is ever the Case of the Drill Culture when properly managed.

We have seen, by the Produce already stated, that Drills, with Intervals of two Feet, has produced a Crop of near eighteen Tons to an Acre at one Cutting; and as Burnet appears to be so destructive of Weeds, as hath been already shewn, I do conceive the best Manner of sowing it, would be on Ridges of four Feet and six Inches, two Drills on each Ridge with the Drill-plough, ten Inches asunder, as we do Wheat, and which has been already described.

This Method would afford a plentiful Crop, and sufficient Room for Horse-hoeing, and we shall have no other Trouble than to clear the Weeds from the narrow Space of ten Inches during the first Summer; for I apprehend the Burnet will keep it free from Weeds ever after. The large Interval will require to be Horse-hoed about three Times in a Season.

We have seen that the transplanted, with Intervals of two Feet, in the *second Season*, has afforded a Crop in the Proportion of seventeen Tons from an Acre at one Cutting. This, I apprehend, we may reasonably expect to increase, in Point of Produce, as it advances in Age. Whoever shall be inclined to cultivate it extensively in this Way, I apprehend will find it most successful, and attended with the least Trouble and Ex-pence, to transplant it in Rows three Feet asunder, and the Plants six Inches in the Rows, as I have recommended for Lucerne, first preparing the Ground in the same Manner. Weed the Rows the first Summer, and Horse-hoe them in the Manner already mentioned. This Method, I do apprehend, will eventually afford the largest Crops.

It may perhaps appear extraordinary to some Readers, that I should apprehend greater Crops may be obtained by transplanting than by any other Method, when I have already shewn that the broad Cast has so much exceeded the rest in Point of Produce; but I shall now shew upon what it is that I build that Expectation. On the 27th of last *May*, I cut the Growth of a single transplanted Plant, which had been two Years put down, and the Produce was two Pounds and six Ounces.

Let us suppose then the Burnet to be transplanted in Manner before-mentioned, an Acre would contain 47040 Plants, which, all being of equal Goodness at two Years old, would amount to a Produce of fifty Tons. This Circumstance I own has great Influence on my Opinion. And it may not be improper to observe, that Mr. Rogue himself, the Parent of this Plant, says, he has sown it in Drills and broad Cast, and that " both Ways are equally good * ;" which I consider as no small Concession from a Man, who attempts to cultivate *Lucerne* in the broad Cast Way.

LAUGHLINSTOWN,
April 22, 1767.

• *Museum Rusticum*, Vol. IV. p. 179.

T H E A P P E N D I X.

WITHOUT any farther Apology to the Publick, than that which I have already made in my Preface, for whatever Inaccuracy may be discovered in my Answer to the following Letter, I must request it of the Gentleman, who has honoured me with his Correspondence, to pardon my publishing such Parts of it, as are requisite for illustrating my Thoughts, on the Subject which he has been pleased to propose to me. If any Benefit accrue to this Kingdom, from what I have said on a Matter of such Importance to the Nation in general, the Merit must be ascribed to him, who has been the Occasion of my turning my Attention to it. But if I have failed in the Attempt, I would wish it to be considered, that it is not from any Pleasure I take in publishing my Correspondence that I have done it; but that my Employment being entirely devoted to the Publick Service, Reason and Duty obliged me to comply with the Desires of those Gentlemen, who imagined the few following Considerations would be of Publick Utility.

The Copy of such Part of a Letter to Mr. Baker,
as relates to the Subject of Bog, from ***** Esq;

SIR,

BEFORE I conclude, I cannot resist informing you of (and requesting your Advice on) an Attempt which I have already made to reclaim a Piece of entirely unprofitable Ground. There was in my Park about eight Acres, where Turf or Peat had been formerly cut, but was overflowed with Water info-much that it was useless even for that Purpose, and the Holes and Softness of the Ground prevented even the lightest Cattle from venturing in to feed on the miserable Sedge which it produced. I saw last Spring that there was a Fall sufficient to drain off all the Water, which I had immediately executed, and then ordered my Steward to spare no Pains or Expence to reclaim what then appeared to me very practicable. The Holes were filled, the Banks dug down, and the Surface made level for the Purpose of planting Potatoes. The Manure used was Dung, Lime, Lime and Ashes mixed, and Sea-weed. The whole, to the Surprize of my Steward and Workmen, produced good Potatoes, but the Part manured with Sea-weed much better than any of the rest. This, I must own, a good deal surprized me, as Turf-bog or Peat is nothing else but a Compound of vegetable Substances. I expected from the dissolvent Qualities of Lime, (if any) the greatest Improvement would appear where it was laid out: But it happened to be remarkably worse than any of the rest. I have now put Wheat in this Ground (which I fear will not answer) and covered it with the Shovel; Part of it for Experiment is manured with Sea-Sand. I have tried in several Parts, and at the Depth of ten Feet could not find Bottom to the Peat. Other Parts near the Soil or Arable Ground, have not above a Foot or two of Peat over a barren white Clay. I wish to bring this,
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after this Year, as soon as possible to Meadow or Pasture, and request your Advice for that Purpose.

I am, Sir,

Your most obedient

Dec. 19th, 1766.

Humble Servant.

The Manures of this Place are, * * * *

Sea-Sand, Sea-Weed, Sea-Mud, Lime, Dung, Pidgeon's-Dung.

The Answer to the preceding Letter.

SIR,

YOU do me too much honor in calling upon me for my Advice, as you are pleased to term it, respecting the Improvement of your Piece of Bog, in your Attempts upon which, you appear to have acted with great Judgment, and, allow me to say, with a Spirit, which I regret the not prevailing in the Minds of *all* the Gentlemen of landed Estate in this improveable Kingdom.

In my Judgment you have acted very wisely in making your first Experiment with such a Variety of Manures. The Effect is an Indication of Nature (the best of Guides) which of those Manures is to be chosen, and of which I hope every Tide affords you Plenty. If so, in my Opinion, you may make this or any other Part of your Land produce almost what you please.

You express some Surprize, Sir, that the Sea-weed should have produced by much the best Crop, and that the Lime, from which "you expected the greatest Improvement," should have been "remarkably worse than any of the rest," and as a Reason for your Expectations from the Lime, you say a Turf-

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bog or Peat is nothing else but a compound of vegetable Substances, upon which you expected the dissolvent Qualities of the Lime to operate advantageously.

I shall, Sir, endeavour briefly to give you my little Reasoning upon the different Effects. How far it will be founded on rational Principles, I shall submit to your candid Judgment.

We shall begin, with our Basis upon which we are to work, namely Turf-bog or Peat. You are certainly right, Sir, in calling this kind of Earth "a Compound of vegetable Substances," but you will please to consider of what Kind they are. Small Fibres enveloped or swallowed up by a small Portion of oozy, and almost impalpable Earth, which the falling Rains, and adjacent Springs, all becoming stagnated Water, have been continually raising, to envelope such Weeds and vegetable Fibres; and as the cold Putrefaction hath come upon those Fibres, the Water hath in Course of Time dissolved and destroyed the Food for Vegetables, which is produced from Putrefaction; and which is, of all others in Nature, when warm, in my Judgment, the most happy for the Improvement of Land; but where Water stands, or frequently approaches, those good Effects of Putrefaction, are in Part carried away, and in Bulk destroyed; and therefore this Piece of Land must have been almost in a State of Inactivity for the Production of useful Vegetables.

This Kind of Earth, from the Nature of the Bodies of which it is composed, has no Stability, no Firmness, no Cohesion, when the Particles or Threads which gave it Contact are broken; for when they are really broken, it is a Kind of ununitable Dust.

What is it then that this Kind of Dust wants? Something which is the most apt to dissolve the remaining Fibres, most advantageously to Vegetables. Something to contribute to a kind and wholesome Cohesion; for altho' we talk of reducing Ground,

that the Roots of Vegetables may pass freely into it to seek their Food, yet Nature requires some Stability in the Soil, to lie close to the Roots, by which to give Strength to the Trunk, as well as generously to feed the Roots. Our ununitable Dust also wants a generous Warmth, which can never be acquired, 'till the stagnated Water shall be removed. That being done, the Sun has free Access to the Soil, but that will not effect our Purpose, without a great Consumption of Time, aided by mechanical Operations.

We are therefore to bring in another Agent, namely, Fermentation, which immediately furnishes the Kind of Warmth we want; and which is of such Kind, as will gently reduce for our Purpose, every perishable Body in Nature, and thereby produce salutary Effects to Earth, and for the feeding Vegetables.

What is it then that will be most conducive to this Kind of Warmth, and other good Effects? Such Substances as are the most Heterogeneous, and most capable of Fermentation, and which will kindly admit of being followed by Putrefaction, to effect it's entire Dissolution. Such Bodies as are reducible by this Operation of Nature, and as shall be in Contact with the other, when undergoing Fermentation and Putrefaction, must be more or less dissolved by the same Effects, and will by Attraction, share in the Warmth before spoken of, from the same Reasons that we feel the comfortable Effect of Fire when we approach it, or the severe one, when we are too near it.

I submit it, Sir, whether this does not seem to account for the happy Effect which your Sea-weed produced: a Body which I consider, perhaps, as the most Heterogeneous that can be procured in *Quantity*, for the Improvement of Land: For it abounds with Salt of the marine kind, putrid Water, animal and vegetable Substances, Earth and Oil, and is prone to Fermentation, which by Consent of all the Bodies of which it is composed, is kindly followed by Putrefaction.

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Perhaps you may think me wrong here, in saying by Consent of all the Bodies, because I have named marine Salt as one: but, Sir, there is nothing more capable of falling into Putrefaction than Salt when dissolved, which resembles a rotten Egg in Smell, more than any Thing I know of.

Next to Sea-Weed is Animal Dung, and Urine of all Kinds; and the Dung of those which feed the highest, will always be found the best to effect the Purposes before-mentioned.

These Kinds of Bodies will furnish the Kind of Warmth before described, in Proportion to the *Quantity used*, and will in Part reduce the Particles and Fibres, which remain Candidates for Dissolution in your Peat; and by these Operations of Nature, will in some Measure contribute to the requisite Cohesion which I before described, as being necessary to be brought in Aid of this Kind of Earth.

It is an incontestable Fact, that all inflammable Bodies contain more or less Oil, in Proportion to their Capability of being consumed by Fire. We all know that Turf-Bog, or Peat, is very capable of being reduced by Fire: We cannot therefore doubt the Certainty of its containing Oil.

From hence we shall be able, perhaps, to account a little for the Failure in the Improvement which you expected from the Lime. Lime is a calcined Stone, effected by violent culinary Fire. In itself a powerful Cauſtick, at the same Time it must be admitted to be a strong Alkali. From these two Qualities, it has a wonderful Attraction of Water, Acids, and Oil: but before the two former can destroy the pungent Quality of the Lime, the Mischief is done; the Oil in the Peat rushes into it, and is there destroyed by the cauſtick Quality of the Lime, which is a Kind of secret or hidden Fire. Our Shoes, Cloaths, and Hands prove it when we touch Lime, by their being burned. But, Sir, please to put a little Oil on a Lump of

of Lime, and you will immediately see the Force of this Reasoning, because the Effect will appear.

Besides, Lime gives to your Peat or Turf-Mold a Kind of culinary Warmth, which differs widely from the genial one of Fermentation. Its Operation is violent for a Time, and afterwards becomes cold and ungenerous to Plants in such Soil, to which (Plants) Extremes in general are Enemies.

Hence it should seem that Lime is not endued with that dissolvent Quality of the "Compound of Vegetables," which you so properly called the Turf or Peat. It might, perhaps, dissolve succulent Plants, as it doth the Adhesion of Hair and Wool in the Tanners and Vellum-Makers Vats. But for our Purpose, due reasoning upon its Nature and Powers seems to shew it an Enemy, and the Effect upon your Bog has in some Measure proved it.

It may be demanded, how it happens, if Lime be so destructive to Oil, that actually burning the Peat, and strewing the Ashes, should have such good Effects, as have been often found? To this I Answer: Actual Fire produces from vegetable Substances, an actual alkaline Salt, which of all others, is the highest Manure that can be procured for Land.

The specific Attraction of this Salt, with the acid Spirit known by all Philosophers to float in the Air, causes such an Effervescence in the Soil where the Salts are thrown, as gives immediate Improvement, tho' not a lasting one.

Should you require further Satisfaction upon this Point, Sir, the following Experiment will afford you full Proof.

Take the Ashes of any vegetable Substance, they having been kept dry, and pour boiling Water upon a Peck, in a glazed Vessel, in which let the Mixture stand two Days, frequently stirring it with a Stick;

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then filter or pour the Liquor off clear: let your Cook boil all the Fluid away, over a gentle Fire, in a Stew-Pan. Thus you will obtain the alkaline Salt I have described, and of which all Vegetables will furnish, more or less, by the same Operation. Upon this Salt pour any Acid, and you will immediately see how they will rush together, by shewing great Effervescence, till they both become neutral. This will convince you, Sir, how different is the Effect of Lime and actual Fire.

As to the Completion of your Attempt, in improving this Piece of Bog, there remains one Point, which you will find very material, and which I before-mentioned; *i. e.* to give it some Cohesion. This will be best effected by carting, when the Bog will bear it, as much Earth upon it, of any Kind, as you can collect; at least ten Load to a Perch, (twenty would do better) and manure it highly with Sea-Weed.

Were I to do this Business, I should pursue the following Method, which I beg Leave to recommend to your Practice. Fix upon the Centre, as nearly as may be, of every Acre. To each Place draw 2400 Loads of Earth, 1200 Loads of the Turt-Mold, and at least 800 Loads of the Sea-Weed. Mix these *regularly*, one Stratum above another, handsomely and even as an Hot-Bed. Thus let the Compost remain six Weeks or two Months; then turn it, cutting in Benches straight to the Bottom, which will regularly mix the whole, and by the Approach of the Air into every Part, excite a new Fermentation in it. Soon after that, put this Quantity out upon one Acre, and sow Turnips or Rape in June; plant Cabbages, and such Sort of Things. Before Winter, have proper Drains made to carry off the falling Rains. Let your Crops be carried off by Labourers to the Verge, then in Carriages take them to any Piece of dry Meadow or Pasture *which you would wish to improve*, and spread them *regularly* for your Sheep, every Day covering *fresh* Ground. In the following Spring, sow black Oats, if you have them, or red; lay all flat; roll when the Corn is up, but first sow ten Barrels of common Grass-Seed.

Seed to the Acre; and after rolling, bush-harrow. After your Corn is off, make superficial Drains in the proper Places, and I will venture to insure you good Meadow. I wish you would try one Acre with the Meadow Fox-Tail, now commonly called Timothy-Grass, because it is recommended for this Kind of Ground. See my Report for 1765.

You see, Sir, by the Method here proposed, you can go on with this Improvement, in Proportion as you can collect Materials, and will compleatly finish as you go. You will moreover, I apprehend, pay your Expence with the Crop, besides adding so much Land to your Estate. Another Circumstance will arise, which I am persuaded will be more grateful to you than the former, namely, the Pleasure of shewing such an Improvement, and setting such an Example.

As to your present Crop upon the Bog, if the Water be kept off, I have Hopes you will have Wheat. But if in Spring you should observe the Plants to be risen out of the Mold at all, watch your Opportunity, when the Ground is driest, and drive a large Flock of Sheep over it, in every Part; and let this be repeated two or three Times. Their Feet will press down the Plants, and the Soil about them, which will contribute to that Cohesion which I before mentioned, altho' it will, by this Operation, be only temporary. But please to observe, that I do not mean the Sheep should remain to feed upon the Corn. Drive them on when they are fullest.

In February, I recommend that you get about ten Bushels of Pidgeon's Dung, (of which you say you have.) Let it be pounded on a flat Pavement, as fine as possible. Let this Quantity be strewed *regularly* upon an Acre, and so treat every Acre of the Wheat, if you have Pidgeon's Dung enough, and do it *before you drive on the Sheep*. This will wonderfully invigorate the Corn, because it will very much warm the Soil. If you have not Pidgeon's Dung enough, try some

A P P E N D I X.

some of the Wheat with Malt-Dust in the same Manner, about twenty Bushels to an Acre.

Thus, Sir, I fear I have tired your Patience; but if I have taken up too much of your Time, allow me to assure you, it has arisen from a sincere Inclination to oblige you. If my Sentiments and Reasonings upon Bog shall not correspond with yours, you will please to consider that this is the first Time I have ever been called upon, respecting that Subject; and that in the Compasf of, and Hurry of writing, a Letter, few Men will be able to range their Thoughts so methodically, or be so full as such a Subject requires; a Subject, which is very interesting to this Kingdom. At all Times I shall esteem it a Mark of your Favour, Sir, to be called upon by you for any Assistance that I can furnish.

I am, SIR,

Your much obliged,

And most devoted humble Servant,

LAUGHLINSTOWN, JOHN WYNN BAKER.
Dec. 26, 1766.

A S H O R T
DESCRIPTION and LIST,
With the PRICES of the
Instruments of Husbandry,
MADE IN THE
F A C T O R Y

A T
*Laughlinstown, near Celbridge, in
the County of Kildare.*

Established and Conducted
By Mr. JOHN WYNN BAKER,
Under the Patronage and Encouragement of the
Right Honorable and Honorable DUBLIN SOCIETY.

D U B L I N :

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M DCC LXVII.

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INTRODUCTION.

To the READER.

WHEN I began this Factory, I had no Conception that the Demand would, in many Years, be equal to the Calls of the past Year, and therefore the Plan was originally calculated upon a small Scale. The unexpected Demand, I am sorry to observe, proves the Want of good Instruments for all the Branches of Agriculture in this Kingdom. Sensible of this Inconvenience, the Gentlemen who generously, in behalf of their Country, bend their Attention to that *Support* of every other Science and Manufacture, have heretofore been importing Instruments from such Parts of the World, as they have imagined could best supply them. But from a real Want of an Establishment of this Kind, for the making all Kinds of Instruments for Husbandry, the Importation of useful ones has not answered the laudable Purposes of the Importers; at least the Instruments have not been so generally introduced, as every Man of generous Sentiments must believe to have been the Intention of the Importers; for when they have been landed, they have been immediately carried to the Neighbourhood of the Importer, and at best, brought into Use only in that particular District; so that if a good Instrument should, by this Means, be introduced in the *North*, the *South* could receive no Benefit from it, and so, *vice versa*: from which Cause the general Introduction of good Instruments must have been slow. But when we add the Consideration of an Unwillingness in Mechanicks to make from the Patterns so imported, and what is quite as inconvenient, a Want of Men to shew the Use of them, it is

INTRODUCTION.

not to be wondered at, that Tillage is in no better State in *Ireland*, than it is in many Parts of *England*, where it is, from the same Causes, in as bad a State, I believe, as in any Part of the World; at least, any Part which pretends to the Practice of Agriculture. From the latter Cause, it has too often happened, that Instruments of real Use have been thrown aside, neglected, and abused, until they became unfit for the Use of the most experienced Hand.

It was conceived, that if a Factory were established, for making Implements of Husbandry, it would be a Means of dispersing throughout the Kingdom, Variety of Instruments of the best in their Kinds; but that alone would not have done, if the Maker had not a competent judgment in the Use of them, and a Notion of constructing such new ones as have been wanting, and improving such as have been defective. How far I have answered that Expectation of my Patrons, I shall submit to the candid Consideration and Experience of the Public.

In the mean Time I hope I shall be pardoned for believing, that my Factory has already prevented the Importation of many Machines for Agriculture, and put *Ireland* in Possession of several useful ones, which are to be found in no other Country.

Had this Factory been established in any remote Part, its Effects could not have been diffused through the Kingdom, as, I believe, the Demand will shew it to be. Had it been established immediately in the Metropolis, it would likewise have been less effectual, I am willing to believe, than it has been in its present Situation; for this plain reason, that the mere looking at the best Machines for the Manufacture of land, could not be sufficiently persuasive of their Importance and Use, unless the Management of them in the Field, or, at least, the Effects of their Operations could be seen. The Situation, being not beyond a Morning's Ride from *Dublin*, gives all People, from every Part of the Kingdom, who are occasionally brought to the Metropolis by other Calls, an Opportunity of examining, not only into the Nature and Quality of the Machines, but the different Methods

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of Husbandry carried on with them. The Reports of such as have been here, have induced others, not only to come when they happen to be in *Dublin*, but what must be conceived as more grateful to me, to undertake a Journey of more than an hundred Miles, on Purpose to spend some Days with me. It will hardly be necessary for me to say, it could not be from any personal Acquaintance, because it is well known I am a Stranger here; but from a Zeal in the Cause of Agriculture, which, I have the Pleasure to observe, is peculiar to the Gentlemen of *Ireland*.

I must be allowed to say, that I have frequently, since the Commencement of this Undertaking, felt great Concern, that it has not been in my Power to give so general a View of the different Machines I make, as I wish to do, to those who come on Purpose to see them: but it will be considered, that as fast as they have been finished, they have been sent away, because the Demand has always exceeded the Possibility of execution; besides which, I really have not Buildings to keep an Assortment in; a Point which I am exceedingly anxious to obtain, for the speedier Dispatch of the Orders, and the greater Convenience of the Public.

And I hope it will not be looked upon as extraordinary, that I am not equal to the erecting such Buildings as are necessary to the conducting so great a work as this is now grown, when it shall be considered, that it is very little more than a Year, since the Building which I had erected for a Part of this Undertaking, my Dwelling-House, Materials, and Part of my Furniture were consumed by Fire. And indeed, were it ever so compatible with my Circumstances, I know not whether it would be altogether so prudent, to lay out a large Sum of Money, for carrying on a Work, in which the Public are much more interested, than I can possibly be as an Individual; for I believe it is a well-known Fact, that many Machines which are purchased of me, are intended only as Patterns for others to work by; a Circumstance, which calls for Circumspection and Caution on my Part, in the Opinion of many. These Considerations, added to the unhappy Event of the Fire, *which*

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came upon me by this Undertaking, had almost persuaded me to decline this Factory; but when I re-considered who were my Patrons, and the Country I was serving, I could not harbour a Doubt, but my Labours and Misfortune would, at the proper Time, obtain the friendly Interposition of those, who will consider them candidly and generously. Animated with these Hopes, I have persevered in the Re-establishment of this Undertaking, at an Expence, and under Difficulties, which Timidity and Diffidence would tremble at.

I have understood, that it has been imagined, the Loss I sustained by the Fire has been fully made up to me. I wish I could confirm such Imagination; but the Case was far otherwise, though I shall defer, for the present, entering further into the Particulars of that distressing Event, than to seize this first public Opportunity, of declaring myself much indebted to the Friendship of the Gentlemen who have appeared on my Behalf, and whose Names are too well known, to need a Repetition.

But although my Instruments and Methods of Husbandry are passing into many Parts of the Kingdom, with a Rapidity, which the greatest Vanity on my Part could not have expected; yet, should I live, to be by any Means enabled to carry my Undertakings for the general Improvement of Agriculture in Ireland, to that Extent, which, what I have done, assures me is infinitely wanting, I do flatter myself, that a very few Years might be productive of this Kingdom's obtaining the first Character in the Article of Tillage, which will necessarily pave the Way to Perfection in every other useful Art, as the Neglect of it, must, on the contrary, be attended with the most fatal Consequences both to the Affluence and Honor of the Nation. But I shall defer saying more upon the extending my Plan, till another Opportunity.

I shall now endeavour to give a short Account of the Uses of some of the Instruments named in the following List, every one of which I have numbered, for the more convenient Reference of the Reader.

A short Account of the Uses of the Instruments, referring, by the Numbers, to their Names, and the Description of their Parts in the List of them hereafter given.

MY former Publications have shewn, that the Instruments for the Drill Husbandry are calculated only for that particular Species of Culture; and therefore I shall take no other Notice of their Uses in this Place, than just to say, that for the Information of those who may adopt that particular Husbandry, I have ranged the necessary Instruments together, that they may appear at one View, under the Heads, N^o. 1, 2, 3, 4, 5, and 6, in the List.

N^o. 7. Contains an Account of the necessary Harness for the using these Instruments, the bulk of which, it is to be presumed, most People have; those who have them not, will please to order them with the Machines, otherwise they will not be sent.

N^o. 8. Is a Drill Plough, to which I have given a Place in my List, because I have met with some Persons, who have conceived an high Opinion of that Species of Husbandry, for which that Plough is calculated. My Sentiments upon *that Practice* of the Drill Culture will be found in my Report for the Year 1766, Page 38.

N^o. 9. Is a Plough which has been found to answer all the Purposes of the breaking and manufacturing Fallow of any Kind; the Draft has been found easy to the Cattle, and the Plough, from the Manner in which it is fortified with Iron in every Part subject to Distress, is rendered irresistible, save, that the Coulter, Sock, and Ground-Plates, from the constant Friction in the Soil, must wear, and therefore will sometimes want repairing. What recommends this Plough very much to the Practice of the common Ploughman is, that it approaches the Plough he has been used to, more than any other I make, except the Chip-Plough, N^o. 10, which I cannot recommend the Use of to any Man, because the Chip is never large enough to take a Share with a large Socket, by which Means all Chip-

The Description of the Uses of the

Ploughs are apt to break off behind the Sock or Share ; whereas, my Socks are made large in the Socket, and are always put upon the Point of the Cross.

The Plough, N^o. 11. is calculated for throwing up the last Sod, in sowing Wheat under the Plough in small Ridges, in order to bring the Furrows narrow in the Bottom ; and which I believe answers the Purpose very well, though I have not used it myself, for Reasons which will appear presently. See p. 9. No. 15.

N^o 12. Is a Plough for the Purpose of skinning Ground for burning ; and I have the Pleasure to understand, that this Plough has compleatly answered the Purpose to those who have used it. I shall just be allowed to say, that the burning some Kind of Land is undoubtedly a very good Practice, upon its first Improvement ; but in other Cases it is altogether as bad a Practice as can be introduced. See my Hints upon Husbandry, published by Mr. Flinn in Castle-street.

N^o. 13. Is a Plough calculated for two Horses, said by some People to be capable of the first breaking, and compleatly manufacturing any Ground for Fallow. I must dissent from that Opinion, because I am sure there is much more Land which two Horses cannot effectually break, than there is which they can. To support this Opinion, of two Cattle being sufficient to break Land in general, shallow plowing is recommended as a general Practice ; a Practice so contrary to all Principles, that it is hardly worth answering. But let any Man carefully examine the Roots of the Plants which are in the Farmers Department, and he will find, that they pass a great Way into the Soil, if the Tiller will, by proper Tillage, allow them to do so ; but if he will only just skin the Surface, particularly in a strong Soil, he must not expect the Roots of small Plants to penetrate in Search of Food, where he has not introduced his Coulter and Share to a proper Depth ; and with the Strength of two Horses he cannot ; though I defy any Man to hurt this Plough, as I make it, with four, by fair Work. But if, from a Plan of Oeconomy, the Farmer wishes to introduce this Plough, he certainly

INSTRUMENTS OF HUSBANDRY.

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tainly may do it to Advantage, after he has deeply broken his Fallow, and well reduced it by the Harrow, provided he does not let it remain too long to consolidate. And if, by this Saving; he can be prevailed upon to add one more ploughing than usual, he will undoubtedly find his Account in the Use of these Ploughs in the manufacturing his Land ; but 'till he can be dispossessed of the inconsistent Notion of its being possible to make his Land *too fine*, I fear we shall not introduce the Extra-ploughing. The established Method of not exceeding four Times ploughing Fallow, is founded in Ignorance ; every Fallow should be ploughed, until it is well reduced to receive the Seed.

Nº. 14. Is the Lomax-Plough for four Cattle, to draw double, and is such a one as Practice has induced many People to approve, I having sold many of them ; but every common Ploughman does not like them so well as they do the one I mentioned before, Nº. 9, neither are they, indeed, so fit for *stony* land, as that, but in every other respect, answer all the Purposes of compleatly working fallow.

Nº. 15. Is the Plough which I have called, in my Report for the Year 1766, p. 40, the *Seeding* Plough ; in the Use of which the Farmer will find many Advantages : but I shall say no more in the Recommendation of it, than to refer him to the Report already mentioned, and leave his Experience to examine the Merit of the Instrument, in the sowing Corn under the Plough. I before said, when I was speaking of the Hunting-Plough, Nº. 11, that for Reasons which would appear presently, I never had used that Plough ; which are, that I find this Plough answers all the Purposes of *that* and the four Horse Ploughs, which are used for the *sowing* or rather *burying* Wheat. Some indeed, who pay Attention to their Tillage, have very properly had two of these *seeding* Ploughs, which, with one four Horse Plough, we call a Set of Ploughs for the common Husbandry. The two small ones are the one wider, the other narrower in the Sole : the latter of which always follows the wider one, and clears up the Hunting, by which the Work goes on mathematically ;

whereas,

The Description of the Uses of the

whereas, it would be inconsistent, in finishing the Ridges, to have the wider Plough following the narrower. A Point not sufficiently attended to in the general Construction and Use of Ploughs.

Nº. 16. Is a Plough of the same Kind, to be worked with only one Horse, either in the Field or Garden, which I think may very advantageously be introduced in the Field for sowing Corn under the Plough in broad Ridges, provided the Land be first *well manufactured*; and I am so convinced of it, that this Year I intend to sow ten Acres with this Plough, but then I shall add a small Harrow to hang to the Plough, to be drawn by the same Horse. See Report for 1766, p. 42.

Nº. 17. Is a Plough which is calculated for keeping Land flat in its Tillage; I presume first introduced on very dry Land, the better to retain Moisture, in which, I have no Doubt, but that it may answer; and it has also been introduced for the Purpose of laying Land flat, which is intended for Lawns and Meadows. I shall not enter into the Merits of this Instrument, further than to say, that I have endeavoured to divest it of the Wheels, by which to render it a cheaper and less complicated Machine, than it can be when worked with a Carriage.

Nº. 18. Is a Plough, which Mr. *Tull* sensibly calculated for the speedier Reducement of Ground; but the Draft of it is no less heavy than its Expence; and at the Time he invented this Plough, the Scarificator, No. 22, had not been thought of. But as we are now in Possession of that Machine, which will so effectually cut the Ground into Slips or Strings of three Inches broad, that by preceding the four Horse Plows, Nº. 9 or Nº. 14, a little while before the Ploughs begin to turn the Land, all the Purposes of Mr. *Tull's* four-coulted Plough will be answered.

Nº. 19. and 20. Are Wheel-Ploughs, which, from my Observations upon their Operations, I conceive cannot be so effectual in general Use, as Ploughs without Wheels, for this plain Reason, that as the Wheels are the Gauge for the Depth of the Plough, wherever

wherever they meet with any Thing which raises them, the Plough consequently rises so as to plough shallow, and sometimes not to touch the Surface; at other Times, when the Wheels sink into any Declivity, the Plough immediately sinks in Proportion, so that the *Ploughing* is render'd irregular by those Kinds of Accidents, and will continue to be so until the Ploughs have been at Work upon the same Land for some Years. Another Consideration against them is, that they are in general complicated, and not a little expensive.

Nº. 21. Is an Instrument, calculated for the Purpose of marking out Drains with strait Edges, in order to save the Expence of that Part of the Work being done by a Spade and Line, which is attended with Delay; and the Machine is so constructed, that the Drain may be marked out from sixteen Inches to two Feet wide, at Discretion. Where large Quantities of this Kind of Work is to be done, the Machine will save considerable Expence; but where the Quantity of Work is but small, it will be an unnecessary Purchase.

Nº. 22. Is the Scarificator mentioned before, when I was speaking of Mr. Tull's four-coulted Plough, to which it will be a very useful Substitute: and as to its other Purposes, I refer the Reader to what I have said of it, in my Report for the Year 1765, p. 41, &c.

Nº. 23. Is an Instrument which I built upon the two preceding ones, in order to lessen the Expence to those who may have Occasion for them both, and which I have the Pleasure to observe, operates compleatly in either Case.

Nº. 24. Is calculated for sinking Ditches by the Strength of Horses, after they are laid out, in order to save *Spade Work*; but after the Ditch shall be sunk, the Sides, it will be imagined, must be dressed by the Spade. This Plough has also been found very useful in sinking Potatoe Furrows, which saves the Labour of the second Spitting, and reduces the Soil at once to the Command of the Shovel. It has also been found useful

The Description of the Uses of the
in deepening the Furrows, for the second covering of
Corn by the Shovel.

N^o. 27 to N^o. 37, both inclusive, are Harrows of different Kinds; Instruments so universally known, that I need not say more of their Use, than just to observe, that the Harrow, in general Use in this Kingdom, is too often ineffectual in its Operation, by its being made only in one Frame; but by mine being made in two Frames, united together by what I call coupling Bolts, they lie close to the Ground, even in irregular Places, and therefore, I flatter myself, fulfil the Purpose of the Machine, namely, harrowing; whereas, the Harrow which is made with one Frame rides all rising Places in the field, and consequently passes over hollow Places very frequently. The triangular Plough-Harrow, N^o. 32, is indeed an Exception to this Observation, because it consists of only one Frame; but then this Instrument is made in a particular Manner in the Pins, to *bite* the Ground, (if I may be allowed the Expression) because the Operation of it is diametrically opposite to that of the common Purpose of Harrows; for this Instrument acts like a Miner under the Surface, the others act above it. And, indeed, the very *Name* which I have given to this Instrument seems to indicate, that it is to act somewhat like a Plough, as well as an Harrow. This Instrument is wonderfully powerful in reducing Ground, clearing Weeds, Stubble, &c. and is really easier in its Draft, than would be imagined by looking at it.

N^o. 38. Are Sledges and Truckles for various Purposes. I shall only just add, that I wish it were more generally the Practice, to introduce Sledges for removing our Ploughs and Harrows from Field to Field than it is; for by the too general Manner of removing them, they often receive more Injury than by a Month's Work; besides which, the Cattle are sometimes hurt.

N^o. 39 to 49, both inclusive, are Waggons and Carts of different Kinds. Were I to enter into a general Description of their Construction, it would swell this Paper greatly beyond the Bulk of what I intended; and therefore I shall only beg Leave to inform the

Reader, that I have given very particular Attention to the Improvement of this Kind of Carriages; and I have the Pleasure to think, that the Demand I have for them, is as strong an Indication as I can have, that in the Judgment of others, I have not been unsuccessful in that Attempt.

Some Considerations upon the Construction of the Two Sorts of CARS in general Use, throughout this Kingdom; with a Description of One of a new Construction, No. 50. calculated to carry greater Burdens, and with much more Ease and Safety to that generous Creature, the Horse.

TH E Advantage which is apprehended to be gained by the Lowness of the Wheels of common Cars, is said to arise, from the Weight of the Load, pressing them forward. And yet, I have generally observed, that the *greater* Weight of the Load, is put on *before* the Wheels, and that *entirely* in loading stones. Hence it should seem, that if the Weight of the Load, does at all contribute to the Motion of the Wheels, instead of its contributing to their Motion *forward*, it must on the contrary, press them *backwards*. And the *lower* the Horse, the *greater* will be *that Effect*. But to be mathematically full upon this Head, would require more Room, than the intended Bulk of these Considerations will admit of.

The Gudgeons are in Contact with the Bolsters, which are always *Wood*, and therefore the Friction must be more laborious to Cattle, than when in Contact with Metal or Brads. Besides, the Bolsters are generally about four Inches broad, and therefore bear four Inches upon each Gudgeon, which must still cause a greater Resistance, by an *Increase* of Friction. Whereas a small Spok Wheel, when *properly bung*, will not have a Friction of more than an Inch and an half, and that will be lessened by its being Steel against Metal or Brads.

The inside Car is yet a more laborious Carriage to Cattle, because the Friction in that is between *Wood* and Inside Cars,

their Friction.

and

The Description of the Uses of the

and *Wood*, which is in Contact *eight* and *ten* Inches. The Axis is of Timber made round ; and the Sides of the Car are laid upon that. To prevent the Axis wearing, in the Place of Friction, it is often stuck with Nails. I have lately seen a few Instances, where the Axis has been covered, in the Places of Friction, with Cast Mettle, which is an Amendment.

*Wheels,
how made,
and how
fixed upon
the Axis.*

Both the Carriages of this Kind, and which are the common ones of *Ireland*, have their Wheels made of Plank, commonly called *Block Wheels*. Through these Wheels pass the Axis, which is of Wood, and generally about four Inches *square*. The Wheels have a *square Mortice* made through them to receive the Axis upon which they are *firmly wedged*.

*Consequen-
ces.*

The Consequence is, that the Axis must always turn with the Wheels : And one Wheel cannot turn independent of the other. Hence follows infinite Distress to Cattle.

For when the Carriage is to turn short, as soon as the Point on which the Horse preffes at his Shoulder, forms an acute Angle with the Wheels, the Wheels cease to turn, for they immediately drag. The Horse is obliged to exert all the Power he has against this Resistance ; which in this Operation is Sideways, and therefore he is deprived of at least half his Power, in the very Moment, in which he wants an Exertion of the greatest he has, to conquer the natural Obstruction of the Machine. But if Straw, stiff Dirt, or a Stone, meet the Wheel which should go forward, the Horse actually stops, and cannot move the Carriage, till the accidental Obstruction be removed.

And this Effect arises, in turning either of the Carriages named. The Body of the Carriage is frequently racked and broken, and the Horse often falls.

The Block Wheels in deep Roads, collect and carry with them great Quantities of Clay, which very soon come in Contact with the Car Sides and Inside Back, by which the Horse is infinitely distressed, and at last will be obliged to stop, unless an unmerciful and

and giddy Driver force him on, until he falls by Drawing. Careful Drivers are much interrupted in their Journies, by removing these Obstructions, which frequently require a good Deal of Labour.

In drawing Hay home, the Outside Cars are often stopped by a Collection of Hay between the Wheels, Sides, and Gudgeons, which take so much Time to remove, that I have often had Delay, Irregularity and Interruption ensue, in the drawing home Hay, and which the Farmer must often have experienced.

The Ends of the axis to an outside Car, come so nearly in contact with the Sides, that there is a continual Friction between them. In turning the Carriage, the Ends of the Axis immediately lock firmly against the Sides. All tending to the Distress of the Horse.

Another Cause of Friction.

A short Description of the NEW CAR.

Having thus shewn the Inconveniences which attend the Construction of the common Cars, I shall now shew how far I have endeavoured to remove them, in the Construction of the Car, named in the following List, N^o. 50.

I apprehended, a Carriage which adhered, as closely as might be, to those in common Use, would be most likely to make its Way into general Use.

Why the Form of the common Car was adhered to as much as could be. Friction, why less in this Carriage than a common Car.

First, as to the Objection made to the Friction in the common Cars, I have endeavoured to lessen that in this Carriage, by iron Arms, steeled; running in Metal Boxes, touching in each Wheel, only about an Inch and an Half.

The one being Steel, and the other Metal; both hard Bodies; it is apprehended the Friction must be considerably less than in a common Car; and consequently the Resistance lessened at equal Weights.

Brass Boxes would have been chosen, were it not, that it is apprehended they would be too dear for the lower people.

Why Brass Boxes were not chosen.

The

The Height
of the
Wheels.
The Body
raised. And
why.

The Height of the Wheels exceed those of a common Car only about six Inches: But notwithstanding that, the Body of the Carriage is raised, by the Manner of hanging the Wheels, which will appear in the Machine. The Reason for which is, to bring the Shafts as near upon a strait Line as may be, to the Point of Draft in the Horses Shoulder; whereas, in the common Cars, the Points of the Shafts (commonly called the Sides) are so high, caused by the Lowness of the Wheels, that when the Draft is from the Points of the Shafts, the Shafts, and Point of Draft in the Shoulder of the Horse, form an obtuse Angle, by which the Horse is drawing upon his Back, greatly to his own Distress. To remove this Inconvenience, some have a Chain running as far back, under the Shaft from the Collar, as brings the Draft upon a direct Line. But this is liable to two capital Objections, particularly in the common Cars. Because in the Action of turning the Carriage, the Shaft from which the Beast draws, is a Lever to him, and by so much as he loses of its Length, in Proportion he is deprived of the Use of it, as a Lever. And every Man knows that the Ease of a Purchase, depends upon the Length of the Lever. The other Objection is, that when the Carriage inclines to fall backwards, which is too often the Case, the Horse cannot prevent it so effectually by his Draft's being so far back upon the Shafts, as he can when his Draft is from the Points, upon the same Principles, that his Lever is considerably shorter, than when he draws from the Points of the Shafts. But in this Case, the Purchase is perpendicular; whereas in the former it is horizontal.

Wheelsturn
independent
of each
other.
And why
Spoak
Wheels are
chosen.

FurtherRea-
son why
Spoak
Wheels are
chosen.

As to the Inconvenience, which attends the common Car Wheels not turning properly; in this I have totally removed it, by using Spoak Wheels, which are to turn upon the Axis, independent of each other; but the Axis is not to turn, as in a common Car.

Another Reason for choosing Spoak Wheels is, that they are by no Means so liable to collect Clay or Dirt in

in their Passage, as the Block Wheels to a common Car, and therefore less liable to the Obstructions caused thereby; unless when they are improperly hung, which In common Practice, I am sorry to observe is too prevailing in this Kingdom, Wheels and even in *England*, as may be explained to such Persons as shall wish to understand it. As may also, the perly.

Manner of clouting a wooden Arm, or making an Iron one to most Advantage, which as much as possible, is kept a Secret in the wheeling Busines; for there are many Men of that Trade, who can make a good Wheel, and yet know not how to bush and hang it! Upon which totally depends the easy Draft of a Carriage.

To bush a Wheel in the best Manner, and most expeditiously should be done with an Engine, calculated for that Purpose only.

Block Wheels cannot be bushed properly, as Experience has often proved; for there are Gentlemen of Ingenuity in this Kingdom, who have seen the great Inconvenience attendant on the Operation of the common Car, and have attempted to remove it, by putting Boxes in Block Wheels, in order that they might turn independent of each other, upon Iron Arms; but it has been found, that great Difficulty attended the fixing the Boxes, because, if put really into the Plank, they cannot be wedged, it being impossible to drive the Wedges across the Grain of the Plank. To remove that Difficulty, a Piece of Timber has been lodged in the Centre of the Wheel, placing the Grain of the Block horizontally, and thereby the Boxes could be firmly fix'd in that Piece: But the Remedy was almost as bad as the Disease; for the Block, or Piece of Timber, which is so lodged in the Centre of the Wheel, soon became loose by Labour and Contraction, and consequently that Part of the Carriage must fall into a crazy Fabrick; abstracted from Labour being increased to the Horse, as soon as the Wheels, in their revolutions, form that offensive Sight, zigzag Lines, which is the unavoidable Consequence of being out of Square, be the Wheels what Kind they may.

The Description of the Uses of the

Manner of putting on Tire improved.

In the Article of putting on the Tire, I flatter myself some Amendment is also made, and which I now pursue in all the Carriages made in my Factory.

In the common Manner of putting Tire on Wheels, the Nails are apt to start, and the Heads break off, by either of which Accidents the Tire gets loose, and the Wheel is suddenly racked or shaken. To prevent this, I put every Strake on with Screw-bolts, which draws up the Tire, and keeps it to its Place, from which it never can start, till the Tire be worn out.

Roads how to be preserved by the Manner of making Tire-Nails.

The Manner of making the Heads of the Bolts, and punching the Tire, I apprehend, would be a great Preservation of our Roads, were it in general Use. And therefore seems to merit the Attention of the Legislator; for by the general Manner of making the Nails for Tire, the Law for the Establishment of broad Wheels is defeated.

Dirt and Grit, how prevented getting into the Boxes.

To prevent any Dirt or Grit getting in between the Boxes and Arms of the Carriage, Sand-pans are put upon the Ends of the Stocks, and Cuttoos over them, which will appear upon View. And which are put upon all the Carriages made in my Factory. The Iron Brackets which are mentioned, as being added to this Carriage, No. 50. in the following List, are disposed in such Manner, as to fortify the Parts most liable to fail in a Car; the Shafts or Sides are plated with Iron from the Axis to the Tuck-pin Holes, and in every Part firmly affixed with Screw-bolts, which renders this Carriage a Machine of almost irresistible Strength and Permanence.

I might have been much fuller in my Description of this Car, but the Demand I have had for them is a stronger Proof, than any other I can give, of their superior Convenience, in every Kind of Business, in which a Car can be used; and therefore I shall only add, that one Horse has drawn, at one Load, upwards of 26 Hundred Weight upon one of them on a very rough road; and I am well persuaded, that the same Horse can draw upwards of 30 Hundred on the same Carriage, without any great Distress; and what seems

to be a pretty strong Fact is, that since I introduced these Cars, my People will not use the old ones, if they can seize these.

And it is allowed by competent judges, that they are compleatly calculated, not only for the Use of the Farmer, but for Sumpter Carriages on Circuits, military Baggage, Linen Cloth, Carriers, Millers, Timber, and Luggage of all Kinds; because severe Trials in the Use of them have shewn, that a Horse travels with Pleasure under a Load from 12 to 20 Hundred Weight upon one of them; when, on the same Journey, an Horse, under a common Car, with 6 and 7 Hundred upon him, has been suffering exceedingly by his distressing Draft, of which we have had many Instances, and very remarkable ones in bad Roads.

It must be confessed, that the Price is higher in the first Purchase than a common Car; but yet, when it is considered that this will last much longer, and that the same Horse which draws 5 Hundred on a common Car, will, with more Ease, draw 12 Hundred on this, Candour must admit it to be a much cheaper Cartage, for all the Purposes of Business and Profit. And all Men will allow, that no *perfect* Machine can be had at the Price of an *imperfect* one.

For the Convenience of such Persons as use Turf in their Houses, I have lately put a Cradle to this Carriage, to be put on and taken off occasionally, (see N^o. 51.) by which it is said, by those who are acquainted with Turf, that as much may be drawn at one Load, as at three or four, in the common Manner.

N^o. 52 to 78; both inclusive, contain a List of various Articles, which, from their Names, shew their Uses, altho' some of them are new; those which are improved in their Construction will shew for themselves.

N^o. 79. Is an House and Boxes, calculated for the Preservation of Bees, by which large Quantities of Honey and Wax, it is said, may be taken, without murdering those laborious Insects. I have, in some of my former Papers, professed not to understand the Treat-

The Description of the Uses of the
ment of Bees ; but from an Attention which the DUG-
LIN SOCIETY have lately given to their Preservation,
I was animated into an Application towards the Ma-
nagement of them, and have received great Informa-
tion in reading Mr. Moses Rusden's Treatise upon that
Subje&t, and from whose Book I have built one of these
Houses, &c. described, N^o. 79. The Pleasure I have
received, in seeing their Industry and Mechanism,
which this Manner of keeping them admits of, I have
conceived to be a full Recompence for the Expence of
building their little Habitation, and the Succes which
the Method promises, induced me to give it a Place
in my List. The Edition which I have of Mr. Rusden's
further Discovery of Bees was printed in the Year
1679; whether it has gone through many Editions I
know not, but I fear it is now out of Print, which be-
ing, I think such Gentlemen as are reputed Judges of
this Management of Bees, would do the Public a Ser-
vice, to recommend the re-printing this Book,

N^o. 80. Is a neat and convenient Kind of Crib, for
the more commodiously foddering black Cattle without
Waste of their fodder, calculated more as a Pattern for
Gentlemen and Farmers to build them by, than with
any Expectation of selling them, they being too large
to be carried to any great Distance, but may very
conveniently be remov'd from Place to Place upon a
Farm.

N^o. 81. Is a Machine, calculated for the slicing Turn-
ips for black Cattle with Expedition. An Instrument
which I was induced to bend my Attention to the Con-
struction of, from observing that the Society of Arts in
London had offered a Premium for the Construction of
such a Machine. In that which I have made for the
Purpose, it is conceived by competent judges, that I
have not been unsuccessful, because the Machine is
fortified by great Strength, at the same Time that it
has powerful Execution. The Simplicity of its Con-
struction will render it intelligible to any Man, imme-
diately upon a View of it. The Reasons why it is pru-
dent to slice Turnips for Black Cattle, will be found
in my Report for the Year 1764.

INSTRUMENTS OF HUSBANDRY.

21

N^o. 82, and N^o. 83, are sufficiently described in their respective Places.

N^o. 84 to 92. Are Geers and Traces of different Kinds, calculated for the Safety of Cattle, in their Work, in which, with the common Tackling they are often cut and hackett on their Sides and Backs.

A LIST of the INSTRUMENTS.

N^o. 1. THE DRILL PLOUGH, upon an improved Construction, with Brass Boxes, and compleatly mounted with Swingle-trees, Straps, Turnip-box, and Standards; and for sowing Wheat, Barley, Bere, Oats, Peas, Beans, Turnips, Sainfoin, Burnet, Buck-wheat, &c. 8 Guineas. See p. 7.

N^o. 2. The DRILL HARROWS, of a new Construction, riveted and mounted with fifty-four Harrow-pins, hung to a Carriage with Chains, Hooks, Keys and screw-bolted Staples. The Carriage mounted with Iron-armis, affixed with Screw-bolts and scREWed Staples, Spook-wheels bound with Iron, a Pair of Shafts, double-twisted Back-band, Staples and Hook, Tuck-pins and Chains. 5 Guineas. See p. 7.

N^o. 3. The HOE PLOUGH, compleatly mounted with double Bands, four Iron Wedges, Coulter, Bolts, Keys and Hook, Rider and Screw-bolt, the Mold-board, Land-side and Bottom, plated with Iron, Cross and Beam united by a thorough Screw-pin, a Steel Coulter and Iron Share. 40 Shillings. See p. 7.

N^o. 4. The SINGLE CULTIVATOR, mounted in the same Manner, only that this Instrument has no Mold-board, but is made with a Chip which is plated with Iron. 1*l*. 14*s*. 1*½*. See p. 7.

A LIST of the

N^o. 5. The DOUBLE CULTIVATOR, mounted in the same Manner, but instead of a Share with one Fin, this has two, made of wrought Iron and steeled. 40 Shillings. See p. 7.

N. B. The Instruments, N^o. 3, 4 and 5, are for Horse-hoing Drilled Crops, and to work them requires a single Swingle Tree, and Swivel Chain, and therefore I shall enter it here as N^o. 6. Where any Person shall chuse to have one for each of them, they will please to Order them.

N^o. 6. The SINGLE SWINGLE-TREE and SWIVEL CHAIN. 5s. 5d. This Swingle-tree will answer for any other Plough, which is to be drawn by Cattle lengthways, which is always to be the Manner in Horse-hoing Drilled Crops.

In my former List I named the Marking Plough, and Double Mold-board Hoe Plough, but I there mentioned them as not being absolutely necessary to the Drill Culture, and in the Continuation of my Practice I am confirmed in that Opinion, and therefore I shall not give them a Place in this List, the above Instruments being all that are necessary for the compleat Execution of the Drill Husbandry, except the Harness, and two Muzzles, which I describe for the Convenience of such Persons as have them not, or who cannot conveniently get them.

N^o. 7. The HARNESS for the Drill Husbandry, consists of three Bridles, three Collars, two Pair of Collar Hames, one Pair of Draft Hames, one Cart Saddle and Crupper, two Pair of Traces and one Stretcher, two Back-bands, Belly-bands and Pads, two Pair of Trace Pipes and two Muzzles. Where the Ground shall be of so strong a Nature as to require more than two Horses for Hoing, Harness for a third will be necessary. For the Prices, see Number 83, &c.

N^o. 8. The DRILL PLOUGH of a new Construction, for sowing Drilled Crops in the Flat Way at equal

equal distant Rows. 6 Guineas. *N.B.* I would not be understood to recommend this Instrument, because I conceive but an indifferent Opinion of the Husbandry. But as others may form another Opinion, I give a Place to the Instrument in my List. See p. 7. No. 8.

Nº. 9. The **BLOCK PLOUGH** improved, for four Cattle to draw double, compleatly mounted with Beam-plates and Screw-bolts, Mold-board, Side and Bottom plated with Iron ; the Beam and Cross united by a thorough Screw-pin, double Bands and Iron Wedges, Rider and Screw-bolt, a screw Staple, Hook and Washes, Collar, Bolts, Keys and Hook ; a strong steeled Coulter and an Iron Share of a new Pattern. 2*l.* 10*s.* For its Use, See p. 7. No. 9.

Nº. 10. The **CHIP PLOUGH**, mounted in the same Manner, 2*l.* 10*s.* See p. 7. No. 9.

Nº. 11. The **HUNTING PLOUGH** with an Iron Chip, the Cattle to draw single, mounted in the same Manner. 2*l.* 10*s.* See p. 8. No. 11.

Nº. 12. The **BAITING PLOUGH**, mounted in the same Manner, with a wrought Iron steeled Share, 2 Guineas and an half. See p. 8. No. 12.

Nº. 13. The **ESSEX PLOUGH**, i.e. a Plough to work with two Cattle, both a-breast, and the Plowman to drive, mounted in the same Manner. 2 Guineas. See p. 8. No. 13.

Nº. 14. The **LOMAX PLOUGH**, for four Cattle to draw double, mounted in the same Manner. 2*l.* 10*s.* See p. 9. No. 14.

Nº. 15. The **LOMAX PLOUGH** for two Cattle to draw single, mounted in the same Manner. 2 Guineas. This is what I call my Seeding Plough. See p. 9. No. 15.

Nº. 16. The **GARDEN PLOUGH**, mounted in the same Manner as Nº 3. 1*l.* 14*s.* 1*d*¹₂. This is a Plough

A LIST of the
of the same Make, calculated for one Horse. See p.
10. No. 16.

Nº. 17. The TURN-WRIST, or Kentish Plough,
with or without Wheels. See p. 10. No. 17.

Nº. 18. Mr. TULL's Four Coultered Plough. See
p. 10. No. 18.

Nº. 19. The HERTFORD-SHIRE, or double Wheel
Plough. See p. 10. No. 19.

Nº. 20. The OXFORD-SHIRE, or single Wheel
Plough. See p. 10. No. 19.

Nº. 21. The DRAIN PLOUGH, to mark out
Drains of different Diameters, mounted with a Spokewheel bound with Iron, Iron Axis, double Wheels
behind, plated Sliders, Swivels, Staple, Bolt Key and
Lip; twelve strong Plates bedded in the Beams, Body
Screw-bolts, Brackets and Screw-bolts, thorough Screw-
bolts to hind Axis, two strong steeled Coulters and
Iron Wedges, with Swingle-trees and Chain, mount-
ed. 5 Guineas. See p. 11. No. 21.

Nº. 22. The SCARIFICATOR with four Coulters,
for taking Moss off Meadow Land, and otherwise im-
proving it, mounted with a Spokewheel bound with
Iron, double Wheels behind, double Iron brackets,
plated Sliders, swivel Staple, swingle-tree Brogues and
Loops, five steeled Coulters, their Holes double plated
and the Table-screw bolted. 4 Guineas. See p. 11. No.
22.

Nº. 23. The SCARIFICATOR DRAIN PLOUGH, be-
ing a Scarificator and Drain Plough comprised in the
same Instrument, mounted with Body-bolts, Brackets
and Screw-bolts, a Spokewheel bound with Iron, and
an Iron Axis, two hind Wheels, thorough Screw Bolts
and Brackets to the hind Axis, plated Sliders, swivel
Staple, Bolt Key and Lip; twenty-two strong Plates
bedded in the Beams; two strong steeled Coulters for
marking

marking out Drains, and seven steeled Coulters for the Purpose of Scarifying Meadow Land; Wedges, Swingle-trees, Swivel Chain, Brogues, Loops, &c. 6 Guineas. See. p. 14. No. 23.

N^o. 24. The DITCHING PLOUGH. This Instrument is mounted in the same Manner as N^o. 4, with the Addition of Beam-plates, and is an Instrument of the same Kind, only that it is much stronger. 40s. See p. 11. No. 24.

N. B. This Instrument is to be worked with the Horses one before the other, and therefore requires a single Swingle-tree. No. 26, which is to be ordered, if required with it.

N^o. 25. SWINGLE-TREES which are for drawing double, and a Swivel Chain, Brogues, Loops and Rivets. 12s. and without a Chain, 9s. a Set.

N^o. 26. SINGLE SWINGLE-TREES and Swivel Chain, Brogues, Loops and Rivets. 5s. 5d.

N^o. 27. DOUBLE HARROWS for four Cattle, of a new Construction, with the Pins steeled screwed and nutted; Washers, coupling Screw-bolts, and Nuts; screwed and nutted Staples and Hook. 5 Guineas. See p. 12. No. 27.

N^o. 28. DOUBLE HARROWS for two Cattle, of a new Construction, mounted in the same Manner. 4 Guineas. See p. 12. No. 27.

N^o. 29. SWINGLE-TREES for two hind Cattle of N^o. 27 and N^o. 28, mounted with strong-eyed Bands, Brogues, Loops, Hooks and Chains. 16s. 3d.

N^o. 30. A LARGE HARROW upon Wheels, a new Instrument. See p. 12. No. 27.

N^o. 31. HARROWS for two, and four Horses, with Chains, and affixed to a Carriage with a Pair of Wheels and Shafts. See p. 12. No. 27.

A L I S T of the

Nº. 32. The TRIANGULAR PLOUGH-HARROW, for the reducing Ground ; strong Bulls, Iron-flats affixed with Screw-bolts, Anchor-pins, steeled, nutted and screwed ; Collar-bolts, Keys and Hook. 5 Guineas. See p. 12. No. 27.

Nº. 33. DOUBLE HARROWS for four Horses, eight Bulls mounted with square Pins, coupling Screw-bolts and Nuts, screwed Staple and Hook. 3 Guineas. See p. 12. No. 27.

Nº. 34. DOUBLE HARROWS for two Horses, mounted in the same Manner. 3l. See p. 12. No. 27.

Nº. 35. The TRIANGULAR PLOUGH HARROW for one or two Horses, chiefly for Peas.

Nº. 36. GARDEN HAND HARROWS;

Nº. 37. FLAX HARROWS.

Nº. 38. SLEDGES and TRUCKLES of every Construction, for Ploughs, Harrows, Bushes, Timber, Sacks of Corn, Lead, &c. See p. 12. No. 38.

Nº. 39. WAGGONS with either broad or narrow Wheels, finished in the completest Manner. See p. 12. No. 39.

Nº. 40. CARTS with three Wheels three Inches broad, for one or two Horses ; with a framed Bottom, Compass Shaft Slats and Screw Bolts, and compleatly mounted with strong Stock-bands, Sand-pans, Buttons and Pins ; Cuttoos affixed with Screw-bolts, strong counter-funk Hinges and Screw-bolts, and strong Shaft-straps ; strong Iron Standards screwed and nutted ; Iron Tail-pins and Chains ; Iron Tail-board Lips and Bolts ; Tuck-pins, Chains and Staples, double-twisted swivel Back-band, Staples and Hook ; a strong Iron-sword Screw-bolt and Staple ; strong Hurters, Iron Trap-bolt Staples and Screw-shaft Staples, strong and full sized Tire on the Wheels, countersunk and

put on with Screw-bolts; Fore-carriage mounted with strong treble Iron-bows, Screw-bolts, Centre-pin and Keys, Gudgeons, Gudgeon-hurters and Gudgeon-brackets, affixed with Screw-bolts and strong Shaft-bolt, &c. 11 Guineas. See p. 12. No. 39.

Nº. 41. The same CARRIAGE mounted with Iron Arms affixed with Screw-bolts and Screw-staples. 12 Guineas. See p. 12. No. 39.

Nº. 42. The same CARRIAGE with six-inch Wheels, Wooden Axle-tree. 13 Guineas. With Iron Arms, 14 Guineas. See p. 12. No. 39.

Nº. 43. The same CARRIAGE with nine-inch Wheels, Wooden Axle-tree. 15 Guineas. With Iron Arms, 16 Guineas. N. B. Where the Tire for these Wheels shall be chosen of thin Iron for Lawns, the Price will be less in Proportion to the Quantity of Iron abated. See p. 12. No. 39.

Nº. 44. Two-HORSE CARTS with a framed Bottom, Compass Shaft-slats and Screw-bolts, and compleatly mounted with strong Stock-bands, Sand-pans, Buttons and Pins; Cuttoos affixed with Screw-bolts, strong Hurters, strong counter-sunk Hinges and Screw-bolts; strong Shaft-straps, strong Iron Standards, nutted and screwed; Iron Tail-pins and Chains; Iron Tail-board, Lips and Bolts, Tuck-pins, Chains and Staples; double-twisted swivled Back-bands, Staples and Hook; a strong Iron-sword Screw-bolt and Staple; Iron Trap-bolt, Staples and Screw-shaft Staples; strong and full sized Tire on the Wheels, countersunk and put on with Screw-bolts, &c. 12 Guineas. And mounted with Iron Arms, 13 Guineas. See p. 12. No. 39.

No. 45. ONE-HORSE CARTS, mounted in the same Manner as No. 44, with wooden Axle-Trees, 7 Guineas. With Iron Arms, 8 Guineas. See p. 12. No. 39.

No. 46. The FARMER'S CART for one Horse, mounted in the same Manner as No. 44, and with Iron Arms.

A LIST of the

Arms, and the Addition of Top-railing, calculated for drawing Hay, Straw, Corn in Sheaf or Sacks, Dung, Earth, &c. 7 Guineas. See p. 12. No. 39.

No. 47. BOMB CARTS of any Size.

No. 48. SMALL CARTS, of a new Construction, for Lawns or Grass Walks, which will not cut the Sod.

No. 49. WATER-CARTS of any Construction, either to fill themselves, or to be filled by Hand or Pump.

No. 50. LOW-BACKED CARS of a new Construction, mounted with Spoke Wheels, and bound with Counter-funk Tire put on with Screw-bolts, Iron Arms put on with Screw-bolts, Wing-brackets and Screw-bolts, Tuck-pins and Chains, double-twisted swiveled Back-band, Hook and Staples, 5 Guineas. When a double Centre Bracket, moulded Brackets behind, Shaft Brackets, and Shaft Lining, all firmly affixed with Screw-bolts, a Drag-staff hung on a Swivel, Screw Staple and suspending Chain, Cuttoos, Sand-Pans, Buttons and Pins, Tuck-Pins and Chains are added, then the Price is 6 Guineas. See p. 13 to 19. No. 50.

No. 51. A TURF CRADLE, for drawing Turf, suited to the Cars, to be put on and taken off occasionally, one Guinea. See p. 19.

No. 52. COACH, POST-CHAISE, CABRIOLE, and other WHEELS.

No. 53. WHEEL-BARROWS of a neat and strong Kind, from half a Guinea to 4 Guineas apiece.

No. 54. WHEEL-BARROWS for Gardens, with Broad-Wheels for the Preservation of the Walks. 1 Guinea.

No. 55. WATER-BARROWS for Gardens, with a Pair of Wheels of a new and compleat Kind.

No. 56.

No. 56. WEED-BARROWS for Gardens. 13s.

No. 57. GRASS-BARROWS for Soiling Plough Cattle when standing yoaked in the Field. 13s.

No. 58. SHEEP-RACKS, of a compleat and new Construction, with Bevel Racks.

No. 59. SHEEP-RACKS of a compleat and new Construction, wtih Perpendicular Racks.

No. 60. FIELD-GATES of any Construction.

No. 61. GARDEN-SEATS, CHAIRS, and STOOLS, of various Kinds.

No. 62. ROLLERS for Corn and Meadow, of a compleat and new Construction.

No. 63. SPIKE-ROLLERS of any Construction.

No. 64. A ROLLER for reducing Fallows, be they ever so stubborn.

No. 65. FANNERS for Winnowing Corn in the Barn. 3 Guineas and half.

No. 66. BRASS-WIRE-SIEVES for Corn and Seeds.

No. 67. HAY-RAKES, of a strong and neat Kind, 19s. 6d. per Dozen.

No. 68. IRON RAKES of various Kinds.

No. 69. HAY-FORKS, Handles, Ferrils, and Rivets neatly mounted, 2s. 8d.

No. 70. HAY-PITCHING-FORKS, With long Handles, Ferrils, Head, and Rivets, 3s. 9d.

No. 71. THREE-PRONGED FORKS for Dung, compleatly mounted. 5s. 5d.

No. 72:

A LIST of the

No. 72. THREE-PRONGED FORKS, for raising Stones and Rubbish out of Gardens. 5s. 5d.

No. 73. DRAG-FORKS, for unloading Dung in small Heaps on Land. 3s. 3d.

No. 74. Dock-Irons, for pulling up the Roots; 7s. 6d.

No. 75. The BRIER-DOG, with polished Cheeks, screw-bolted Arm, Block double-hooped, and double-banded Lever, for pulling up Thorns, &c. by the Roots. 1l. 14s. 1½.

No. 76. The STUMPING-IRON, for compleatly taking the Beards of Barley with Expedition, 13s.

No. 77. ENGINES for cutting Hay and Straw for Horse-Meat.

No. 78. VENTILATORS for Hay-Ricks, by which the Hay may be saved without putting it in Tramp-Cocks.

No. 79. BEE-HOUSES and BOXES, for taking the Honey and Wax without killing the Bees, consisting of an House, and six Octagon Boxes, for two Colonies; 7 Guineas. See p. 20. No. 79.

No. 80. CRIBS of a neat and new Construction for foddering Black Cattle. See p. 20. No. 80.

No. 81. The TURNEP SLICING ENGINE, a new Instrument for slicing Turneps for Black Cattle, consisting of a large framed Chest, a Cylinder with Iron Axis and Winch, 30 strong Iron Arms, and nine large strong-stealed Knives affixed with Screw-bolts, 7 Guineas. See p. 20. No. 81.

No. 82. The STUBBLE HORSE-RAKER, calculated for pulling up and gathering Stubble at one Operation, where the Corn shall have been sown flat, either under the Harrow or Plough.

No. 83.

INSTRUMENTS OF HUSBANDRY.

31.

No. 83. The BROAD-CAST TURNEP HORSE-HOE, an Instrument for thinning and Horse-hoeing Broad-cast Turneps.

GEARS and TRACES for HORSES and BULLOCKS.

No. 84. TRACES of different Kinds from 8s. 8d. to 11s. 4d. $\frac{1}{2}$ a Pair.

No. 85. LONG PLOUGH CHAINS, short Liaks, 9s. 9d. Short Plough-Chains, 3s. 9d. $\frac{1}{2}$

No. 86. HORSE-HAMES, of strong compleat Kinds, for Ploughs and Carriages, from 6s. 6d. to 8s. 1d. $\frac{1}{2}$ a Pair.

No. 87. SUSPENDING-CHAINS for Ploughs, 3s. 6d. per Pair.

No. 88. HORSE-COLLARS, from 3s. 3d. to 7s. 6d. a Piece.

No. 89. BRIDLES with Winkers, strong, home-made, polished Bits, 6s. When letter'd, each Letter 4d.

No. 90. PLOUGH-SADDLES, stuffed with curled Hair, Girth, Belly-band, Crupper, Hip-Straps, broad double-buckled Back-band, black Leather, Mortice-blocks, 17s. 6d.

No. 91. BACK-BAND, double Buckles, Pad and Belly-band, broad black Leather, 6s. 6d.

No. 92. TRACE-PIPES of Leather, 3s. 6d. a Pair.

No. 93. MUZZLES for Horses, 4s. 4d. a Piece; These are necessary in the Horse-hoeing drilled Crops, to prevent the Cattle eating the Crop.

No. 94. A LARGE STRONG PLOUGH, mounted in the same Manner as No. 9, and of the same Make, calculated for ploughing from 12 to 18 Inches deep, and

A L I S T, &c.

and to be drawn by any Number of Cattle, from 8 to 16. 3 Guineas.

The Nature of this Undertaking is attended with such a constant Demand for ready Money, that I hope, whoever may favour me with their Commands, will not expect any Credit, as the Nature of the Undertaking will not admit of it.

It is requested of every Person, who may send any Orders by Letter, that they will please to add the Number which is annexed to the Articles in the preceding List to such Instruments as they may please to order, which will equally prevent any Mistakes. And also, to specify whether they would have any Extra Coulters or Socks to such Ploughs as may be ordered; the latter will always be necessary, when the Ploughs are to go to any great Distance, because no other Socks will fit my Ploughs but my own Pattern; the Reasons for which, see Page 23, in my Explanation of the BLOCK PLOUGH, No. 9.

N. B. It has for some Time past been made a Practice to invite my Artificers to do what is called little Jobs for other Persons, inconsiderately, I am willing to hope; because a Moment's Reflection would convince any Gentleman, that nothing can be more indecent and unreasonable, not to use a severer Term, than privately, and to the Interruption of my Business, to call away Men whom I have imported, collected and instructed at a great Expence, whom I constantly maintain together with their Families, and who are to return to me, when the Purposes of the Persons so inviting them are served. Some recent Instances of this Kind, added to many preceding ones, obliges me to mention it thus publickly, which I hope will so effectually prevent a repetition of it, as to render it unnecessary for me to take any further Notice of it.

THE END.

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F I N I S.

EXPERIMENTS IN AGRICULTURE,

Made under the DIRECTION of

The RIGHT HONORABLE and HONORABLE

DUBLIN SOCIETY,

In the Year 1767.

And now Published at Their Request.

By MR. JOHN WYNN BAKER.
EXPERIMENTER in AGRICULTURE to the SOCIETY.

D U B L I N:

Printed by S. POWELL, for the AUTHOR.

A N D

Sold by G. FAULKNER, at the Corner of *Parliament-street*,
and the PRINTER hereof, in *Dame-street*.

M DCC LXIX.

Advertisement,

To the R E A D E R.

IT is now approaching close upon five Years, since the Commencement of my Plan, for propagating a practical Knowledge of Agriculture in *Ireland*, by exhibiting Experiments in the Field. Since the Commencement of my Factory, for making all Kinds of Implements for Husbandry, it is near three Years ; the latter Undertaking, being an unavoidable Consequence of the first ; and though they have the Complexion of distinct Undertakings ; yet, they are inseparable ; for the Existence of the one, without the other, would render them both ineffectual ; but whilst they stand united, I apprehend, Convenience and Information will arise to the Public.

For, if I am not too much flattered, by the Generosity of the Correspondents I have, in almost every County in the Kingdom, these Undertakings have been productive of many good Effects ; particularly, in having introduced a better Culture, than has hitherto been practised, better Machines for the Execution of that Culture, and in the important Article of saving great Quantities of Seed in Sowing. Besides

A D V E R T I S E M E N T,

sides which, Workmen, in many Parts I find, are animated, to imitate the Instruments which I have dispersed, abstracted from the Circumstance of many Men, who have worked with me, from Invitation, and other Causes, being now employed, in different Parts of the Kingdom; and although no two or three of them can make every Machine, which has been constructed in my Factory; yet, several of them can make many very good Ones, if their Want of Integrity shall not impose upon their Employers, as they have repeatedly upon me to my very great Loss.

But, that I may not be thought to arrogate to myself, the Merit of any Benefit, which may have arisen to the Cause of Agriculture, from my Undertakings; I request the Reader, will always recollect, that I consider myself, as no more, than the Agent or Machine, by which these Undertakings move; but that, the *Dublin Society* has been, and is, the main Spring and Pillar, which keeps the whole in Motion; and therefore to that *Society* is due, the Sense, which the Publick may retain, of the Utility of my Undertakings, not only for what they have done towards their Establishment, but that, because the very Existence of them, depends upon their Will and Pleasure. All the Merit I presume to claim is, that I have faithfully discharged the several Trusts they have been

To the R E A D E R.

v

been pleased to repose in me, to the utmost Exertion of my little Abilities, and with truly conscientious Integrity; and am most gratefully thankful to the Society, for their repeated and unanimous Resolutions to that Effect.

Here, I hope, it will not be considered as improper for me, to inform the Society, that in Consequence of that Patronage, which they have honoured me with for five Years past; they have stamped a Reputation upon my Name, not only in this, but the neighbouring Kingdom, and thereby have given such a Complexion of Stability to my Undertakings; that now, I am looked upon by the Publick, as a Person, to whom, under that Patronage, they have a Right to apply for Information, upon every Occasion, in which they want Assistance; and, consequently, my Time is much engaged, in answering the various Letters, and attending the personal Visitations of the Public.

And I flatter myself, that it will be considered, as no Reflection to our Undertakings or this Kingdom, that in all the new Publications, upon Agriculture in *England*, our Experiments are considered as not unworthy of such Notice, as I hope will afford some Satisfaction to the Friends of Agriculture in *Ireland*, at the same Time, that I consider myself, particularly obliged to the
late

ADVERTISEMENT,

late Writers, for the kind Manner, in which they have treated my Labors and Name, and assure them, that I shall always endeavour to deserve their Approbation.

How far, those who have applied, have been informed or satisfied with the Answers which I have given, I shall not presume to say ; but can only assure the Society and the Public, that I always have, and always shall, use my best Endeavours to give the fullest Information, in every Particular, that my Experience will admit of.

In this Character, during the past Year, I have received some anonymous Letters, suggesting different Methods of Improvement, and different Successions of Crops. I consider myself much obliged to every Person who may take the Trouble of suggesting new Hints to me, or of communicating their Thoughts upon Subjects of Improvement, which may come under their Consideration and Experience ; and above all, I am sure the Public will be obliged to such, for communicating their Experiments. But Gentlemen who write to me, without communicating their Names and Places of Abode, will please to consider, that hitherto, I have not communicated any Thing to the Public, in my annual Publications, which has not been well authenticated ; and that if any Scheme of Improvement, was to come to my Hand from

from another ; with an Expectation of its having a Place in my annual Publications, that were I to publish it, I should, in some Degree, be answerable for its Credit ; but if it carried the Complexion of Novelty, it would have Prejudice to combat ; when I should be at a Loss to find its Author, to aid me in its Support : Under these Considerations, I flatter myself, I shall not incur the Censure of my anonymous Correspondents, for not giving a Place to any Paper of that Kind.

Not long since, Gentlemen who wish to serve the Public in this Way, had an Opportunity, of communicating their Observations, by Means of a monthly Publication in *London*, called the *Musæum Rusticum* ; but from a Fatality which will ever attend periodical Publications, that are tainted with Scurrility, and pened principally by Hirelings, this Paper soon expired.

But had it been supported by real Correspondents, there has not many Books appeared in my Time, which promised so much Advantage to the Public ; for there really would have been Pleasure and Emolument arising from such an Undertaking, properly executed ; we should have known what were the Pursuits of the Curious and Ingenious in Agriculture, in every Part of the three Kingdoms ; all conspiring, as if the Labor of one Man,

to

to the Benefit of the Public in general; and therefore I have wished to see it revived, but hitherto, it has not been attempted, that I have heard of.

The anonymous Letters, which I have received, has induced me to wish, something of that Kind to be attempted here, to be published once in three Months, (for oftner, I think would be too frequent) and, therefore, I mention it here, that Gentlemen, who are in the experimental Way, may consider of it; and if any shall think proper to communicate their Thoughts to me, upon any Subject of Agriculture, between this Time and *Mickaelmas 1769*, I shall have great Pleasure in promoting a Scheme of this Kind; and if Matter sufficient can be collected, from *real Practical Correspondents*, during that Time, the Publick may expect the first Publication of a Paper, upon the Plan of the *Musæum Rusticum*, in *January 1770*, and so on, to be continued every three Months, so long as I find it will be supported. In the mean Time, I shall consult the proper Measures, for dispersing the same, through the principal Towns in the Kingdom, for the convenient Purchase of Gentlemen, who reside wholly in the Country, and in Proportion to the Demand; I should hope, so would be our Correspondents.

I have

I have lately discovered, that some Gentlemen have formed an Idea, that my Undertakings have been principally calculated to establish the Drill Husbandry in *Ireland*.

I shall beg Leave to remove that Idea, by reminding them, that the Introduction of the Drill Husbandry, is only one Branch of the general Plan; that we might be able, from real Practice, and repeated Crops, to find the Merit or Demerit of that Species of Culture, for the Information of the Public; and as the most effectual Method to discover the Truth, was to make comparative Experiments between that and the Common Husbandry, upon Ground equally prepared; that Practice has been pursued in the Course of my Experiments, in every Thing which I have yet experimented upon; and in some Articles in the Farmer's Department, that Husbandry has been found to excel the Common; but whether it will actually do so in Corn, by a Succession of Crops, yet remains to be determined, as nothing less than a Series of Experiments can inform us with Certainty.

By this Practice, fair Experiment is also given to the Common Husbandry, as appears by my Reports, under a Culture,

A D V E R T I S E M E N T,

far exceeding that in common Practice, by the introducing better Machines than has hitherto been in Use, and thereby I hope, greatly improving what is understood to be the Common Husbandry.

It will also be considered, that if a Man engaged in such Undertakings as mine are, did not introduce in his Experiments, every Species of Husbandry, thereby to discover by Practice, which is to be preferred; that Information could not arise to the Public, which, I hope, my Experiments have afforded, and will yet afford. To establish or introduce the Drill Husbandry into general Practice, without regard to a judicious Practice of the Common, would have rendered Comparative Experiments unnecessary, because it would have been taken for granted that the Drill Culture is to be preferred. Though I have always had an high Opinion of it, yet I have dissuaded many from it, and never advised any Man to engage in it; but where Inclination has led Gentlemen to attempt it, the Nature of my Undertakings, required that I should give them all the Assistance in my Power.

If Gentlemen who may have contracted the Idea already mentioned, will please to look over my List of Instruments, they will find, full as much Attention has been given

ven to the Improvement and Construction of Machines for the Common Husbandry, as there has for the Drill ; as in an hundred or more Machines, which are named in my List, there are not above five or six for the Drill Culture.

And what seems to be a stronger Circumstance, than any other I can urge, that the Public have found Advantage in the Use of the Instruments for the Common Husbandry, is, that in a Sale of Machines, amounting to near two thousand Pounds, not above two hundred Pounds of that Sum has been for Implements for the Drill Husbandry.

INTRO-

T O

The RIGHT HONORABLE and HONORABLE
DUBLIN SOCIETY,

THIS

R E P O R T

OF

EXPERIMENTS in AGRICULTURE,

IS GRATEFULLY INSCRIBED,

By their Faithful,

And most Devoted,

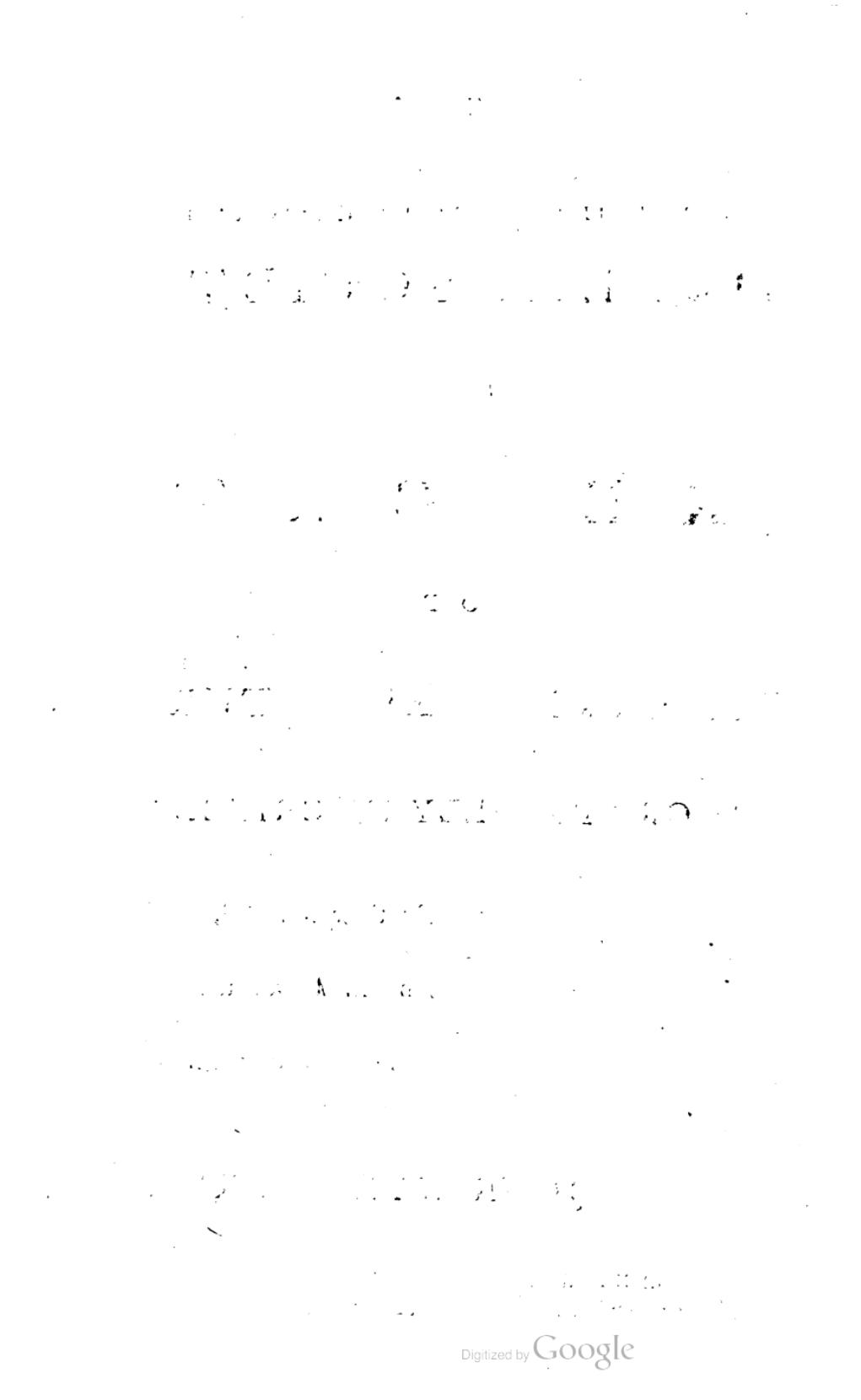
Humble Servant.

JOHN WYNN BAKER.

LAUGHLINSTOWN,
May 11, 1768.

A

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INTRODUCTION.

On the 25th Day of July, 1765,

The RIGHT HONORABLE and HONORABLE

DUBLIN SOCIETY,

Were pleased to make the following
ORDER, *viz.*

“ **T**HAT it be recommended to Mr. Baker,
“ that with all convenient Speed, he will,
“ among his Experiments in Agriculture, al-
“ lot a Portion of Ground, (not less than one Acre)
“ for the Culture of Wheat in Drills, Horse-hoeing
“ the Intervals; and that he also allot another Portion
“ of Ground, (the same Quantity) for the Culture of
“ Wheat in broad Cast; that these two Portions of
“ Ground lie as contiguous to each other, and as much
“ of the same sort of Soil, as may be; that they be
“ both sown with the same Seed, and that Mr. Baker
“ report his Observations, resulting from this Experi-
“ ment to the Society.”

INTRODUCTION.

In my Report for the Year 1765, I informed the Society and the Publick, how far I had proceeded in this comparative Experiment between the Drill and Common Husbandry, in Obedience to the preceding Order,

And in my Report for the Year 1766, I furnished an Account of the Produce of Corn and Straw, from each Method of Culture, in the first Year in which the Experiment had been depending; and also stated every Article of Expence attending the two Methods of Culture, as it was incurred in the Practice, upon the given Quantity of Ground, in a clear and particular Manner.

I have already, in my former Reports, informed the Society, and the Publick, of the State and Quality of the Land devoted to this comparative Experiment, and how it had been treated before the Commencement of this Experiment.

By referring to my Report for the Year 1765, Page 48, it will appear, that the two Acres of Ground devoted to this Experiment, in the first Year, were sown with Wheat on the 5th of October, 1765. By the Report 1766, Page 17, it will appear, that the Acre devoted to the Drill Culture, was again sown with Wheat, on the 18th of October, 1766, with five Stone and two Pounds of Seed. And in Page 17, of the same Report, I mentioned, that I had in October, ploughed half the Acre, which is devoted to the Common Husbandry, in order to plough so much of it twice for Oats, and the Remainder to be sown with Oats after once ploughing, as is the Practice with the common Farmer.

In this I took the Sense of the Society, for Reasons which will appear by referring to my Report for the Year 1766, Page 16.

Thus this comparative Experiment has furnished a third, by which we can form a Judgment, whether once

I N T R O D U C T I O N.

7

once or twice ploughing for Oats, be most profitable to the Farmer.

It now remains for me to report the result of the Continuation of this comparative Experiment for the second Year, and how far I have proceeded with it in the present, which is the third Year in which it has been depending.

Besides the Continuation of this Experiment, I have, extended these Kind of comparative Experiments much further; for I have one Field of twenty Plantation Acres, half sown in Drills, and the Remainder in Broad Cast, with an Hope of giving as full Satisfaction as such an extensive Exhibition can convey to the Publick. And in all, I have above twenty Plantation Acres of Wheat in Drills, which is an Exhibition that hath given the highest Satisfaction to the many Gentlemen and Farmers, who have this Summer resorted to see it, from very many Parts of the Kingdom, in consequence of my having invited all Degrees of Men by public Advertisement; a Ceremony, which I was sorry to find, many considered as necessary to their looking at my Labors; but that such an Idea may not remain upon the Mind of any Man, I beg that every Friend to, and Admirer of Agriculture, will henceforth assure himself, that he will always be welcome to inspect my Experiments, or any other Branch of my Undertakings, so long as I may carry them on under the Patronage I am now honoured with, and all such Persons shall, at the Time of such Inspection, receive every Information which may be in my Power to give.

A 3

E X P E R I-

E X P E R I M E N T S

I N

AGRICULTURE.

COMPARATIVE EXPERIMENTS on WHEAT, between the DRILL and COMMON HUSBANDRY.

The Continuation of a Comparative Experiment, between the Drill and Common Husbandry.

IT now remains for me to give an Account of the Operations upon the Drilled Acre of Wheat, and their Expence, with the Profit of that and the Oats sown upon the Acre of Land, which is devoted to the Common Husbandry.

After the Acre which is devoted to the Drill Culture had produced the Wheat Crop in the Harvest of the Year 1766, as mentioned in my Report for that Year, the same Acre of Ground, was again sown with Wheat in Drills, on the 18th of October following, with five Stone and two Pounds of Seed, for the Continuation of the comparative Experiment.

Winter hoeing, when performed.

The Corn came up in due Time, and received the first or Winter Hoeing, on the 23d Day of November following, which cost One Shilling and Six Pence Half-penny, including Horses, Plowman and Driver, as particularly specified in my former Reports.

The Manner of this Operation being performed, is described in my Report for the Year 1766, page 8, with some Observations, respecting the position of the Corn, &c. after this Hoeing, which are material to be attended to by every person who shall practise this Culture.

The Single Cultivator, when used.

The Spring Hoeing, with the single Cultivator, was performed on the 13th of March, and cost One Shilling and Three pence for the Acre. The manner of performing this Operation, and my Reasons for practising of it, appears in my Report for the Year 1766, page 9.

The Double Cultivator, when used.

Immediately after this, I introduced the double Cultivator, in the manner described in my Report for the Year 1766, page 10, which Operation cost Seven pence Halfpenny for the Acre.

Weeds, when removed.

The Weeds began to rise in May, to remove which, cost Eight pence for the Acre.

Summer Hoeing, when and how performed.

The Crop remained thus, until the 6th of June, when the Hoe Plough was again introduced, in the manner, and for the purpose described in my Report for the Year 1766, page 11, which Operation cost One Shilling and Four pence Halfpenny.

This was immediately followed by the double Cultivator, which finished the Culture of the Crop, and cost Eight pence Farthing. See Report for 1766, page 12.

Tl.e

The Crop remained thus, until the 20th of August, when it was reaped, to do which, took three Men. Drilled Wheat was reaped. The Wages of two of them were at Thirteen Pence a Day, and one of them at Ten Pence; consequently the Expence of reaping this Acre of Drilled Wheat, was Three Shillings.

The produce of Merchantable Wheat, was 5 Barrels, 12 Stones, and 7 pounds, and of Straw, 1 Ton, 9 Hundred, 2 Quarters, and 27 pounds. The produce of Wheat and Straw.

When this Corn was reaped, it was done by Mistake, for the Day before, Business called me from home; and that Morning I was speaking to one of my People, that this Acre of Corn would soon require to be cut, and when I came home in the Evening of the succeeding Day, I found he had cut it, because he said he understood I had directed him so to do. But the Corn should have stood a few Days longer, as it was not sufficiently ripe, which was some Injury to our Produce. Error in the Time of Reaping.

In our Calculation in the Field, upon the Number of Sheaves of Corn, it was apprehended, that our Produce would have been full seven Barrels, but when thrashed, I received no more than 5 Barrels, 12 Stone, and 7 pounds. How this Diminution upon our Field Calculation happened, I cannot ascertain, neither shall I trouble the Reader with my Suspicions, as I received no more, I must only state that Quantity.

I shall now state the Account of Profit and Loss upon this Experiment for the Year 1767, before I proceed to the Acre under the common Husbandry; and then state a comparative Account, of the Profit and Loss upon the two Methods of Culture, for the two Crops which we have had.

Dr.

*Dr. One Acre of Wheat in Drills, as the
Expence arose in the 2d Year.*

1766.

		l. s. d.
Oct. 16.	To ploughing once, after the Crop was reaped in the Year 1766, as mentioned in my Report for that Year	0 10 4
18.	To harrowing the Ground, with the drill Harrows	0 0 4½
	To drilling the Seed Corn	0 0 9
	To Seed Wheat five Stone and two Pounds, at 30 s. a Barrel, so charged, because the Crop of 1766, was sold at that Price, and so charged for the produce of the drill and common husbandry that Year	0 7 8
Nov. 23.	To the Winter Horse-hoeing	0 1 6½
<i>1767.</i>		
Mar. 13.	To the Spring-hoeing with the single Cultivator	0 1 3
	To do. with the double Cultivator,	0 0 7½
April 1.	To returning the Earth to the Corn with the Hoe-plow	0 1 6
May 13.	To Weeding	0 0 8
June 6.	To the Summer's Hoeing, still throwing Earth to the Corn	0 1 4½
	To deepening the Furrow, with the double Cultivator	0 0 8½
Aug. 20.	To reaping the Crop	0 3 0
Sept. 29.	To one Year's Rent	0 18 0
	To thrashing 5 Barrels, 12 Stone, 7 Pounds, at 8 d. a Barrel,	0 3 9
	To neat Profit upon the second Crop	<hr/> 2 11 6½
		5 11 5
		<hr/> 8 2 11½

Per

1767.

*Per Contra.**Cr.*

Sept. 29. By Wheat, 5 Barrels, 12 Stone, 7 Pounds, at 25 s. *	—	7	0	$7\frac{1}{2}$
By Straw, 1 Ton, 9 Hundred, 2 Quarters, 27 Pounds, at 9 d.	—	1	2	$3\frac{3}{4}$
		8	2	$11\frac{1}{4}$

* It may not be improper, for the Information of some of my Readers, to say, that twenty Stone, fourteen Pounds to the Stone, make a Barrel of Wheat in Ireland.

Here

Reasons
why the
Crop of 1767
is charged at
25 s. altho'
30 s. were
charged in
the Year
1766.

Here I must pray the Patience of the Reader, that I may exculpate myself from a Censure, which I may otherwise incur, from the Advocates of the Drill Culture; for high as my Opinion may be of its superior Advantages, when fairly compared with the common Husbandry; yet I cannot allow myself to make partial Representations, any more than I shall suffer my Opinion to be warped by any particular System; or by the arbitrary Declarations of any Man, beat out of a practice, which appears to be founded on rational Principles be the Business to be done, what it may.

Doubtless, it will be observed, that I have charged the Crop of the past Year obtained from the Drill Acre, at only 25 Shillings a Barrel, when it is pretty generally known, that I sold the Corn at 30 Shillings; and therefore it might with a good deal of Reason be said, that I ought to credit the Acre under the Drill Culture, for its Produce at that price, because I sold it so; and because I allowed the same for the Wheat, both of the Drill and common Husbandry, in my Report for the Year 1766.

But my Objections are these. When I charged 30 Shillings a Barrel in the Year 1766, the Corn of both the Experiments, would have fetched that Price in the Market, and had I demanded it, I could as easily have got 35 Shillings a Barrel for it for Seed, as I did 30; but 30 Shillings is the Price I have always sold my Seed Wheat at, and therefore I did not choose to charge it higher that Year, although the Market would have afforded the same Price. And notwithstanding I sold the Produce of my drilled Wheat in 1767 at 30 Shillings, yet, in the Market I should not have got more than 25 Shillings for it; and therefore, altho' it is a Diminution of the Profit, upon the face of the Account as already stated, yet I think no more ought to be allowed for the Produce of these Experiments, than the Market would afford (altho' by extraordinary Care, in the cleaning of it, which is seldom bestowed upon Market Corn, we can sell it higher for Seed, than the Baker can afford to give) for this manifest Reason, that if

if all the Tillage Land of the Kingdom was under the Drill Culture, all the Produce could not be sold for Seed.

However, if these reasons shall not be sufficiently satisfactory, I shall just say, that if 30 Shillings be allowed, our Credit Side of the Account would be 9*l.* 1*s.* 0*d.* $\frac{1}{4}$, instead of 8*l.* 2*s.* 1*d.* $\frac{1}{2}$, which would leave our neat Profit upon this Crop, 6*l.* 1*s.* 6*d.* $\frac{1}{2}$, instead of 5*l.* 1*s.* 5*d.* which makes a difference of 1*l.* 8*s.* 1*d.* $\frac{1}{2}$, upon the Acre.

In the Article of Straw, I have allowed only 9*d.* Straw un-
for every hundred Weight, because that was the Sum der rated.
I allowed the first Year, but it is very well known, that
Straw has been in the past Year from Six to Eight Shil-
lings a Load, and if I had allowed the Market Price for
the Straw, our Profit would have been from 20 to 30
Shillings more, upon this Acre of Ground. But the
Business of selling Straw is such an intolerable Practice,
that I am always concerned to see it in the Market; Farmer.
when on the other Hand, I feel no Remorse, at seeing
it thrown and littered ever so carelessly about the Farmers Yard, for which purpose I consider it very well
worth the Price I have charged, exclusive of the Mar-
ket Expences, saved, in such Use of it; but the mis-
taken Love of Gain, betrays the poor Farmer, into the
Sale of his Straw, when his Land is hungry, because the
Straw is not consumed upon it.

The

The Manner in which the Acre of Land devoted to the Common Husbandry in this Comparative Experiment was treated, for the Crop of Oats, and the Produce, after baving produced the Wheat mentioned in my last Report.

Ground
twice
ploughed
for Oats.

In October, 1766, I ploughed half this Acre of Ground, in order to give it a second ploughing in the Spring for Oats, and the remaining half Acre was left under the Wheat Stubble, to be sown in the Spring with Oats also, at once ploughing.

And why.

My View in this was to ascertain by Experiment, whether once or twice ploughing for Oats be most profitable to the Farmer.—And in this Experiment I took the Sense of the Dublin Society, for Reasons which appear in my Report for the Year 1766, page 16.

When sown.

On the 27th Day of March, 1767, this Acre of Ground was sown with Oats under the Harrow, as is the general Practice, each half Acre having a Barrel of Seed, which is the Quantity usually allowed by the common Farmer, tho' sometimes more is sown.

The Corn came up very well, and was a very good Crop, as will appear by the Produce.

When reaped.

On the 7th Day of September the Oats were reaped, which took six Men, at 13 pence a Day each.

The Pro-
duce.

The half Acre which was twice ploughed, produced 7 Barrels, 11 Stone of Oats, and of Straw, 13 Hundred, 3 Quarters, and 7 pounds.

The half Acre which was ploughed but once, produced 6 Barrels, 9 Stone, and 7 pounds of Oats, and of Straw, 10 Hundred, 3 Quarters, and 24 pounds.

I shall

I shall now state an Account of Profit and Loss upon these Two Half Acres of Ground, independent of each other, in order to take the greater Produce in the comparative Account against the Drill Culture, as well as to compare the Experiment upon the once and twice ploughing for Oats.

Dr.

*Dr. Half an Acre of Ground under Oats,
in the common Husbandry, twice
ploughed, according as the Expence
arose, in the 2d Year of the compara-
tive Experiments.*

		l. s. d.
1766.		
Oct.	To the first ploughing	0 5 2
1767.		
Mar. 26.	To the second ploughing	0 5 2
27.	To feed Oats one Barrel *	0 10 0
	To the Seeds-man †	0 0 6
	To the Harrowing, Horses and Driver	0 2 3
		<hr/>
		1 3 1
Sept. 7.	To reaping	0 3 3
	To threshing 7 Barrels 11 Stone at 5d.	0 3 2 $\frac{3}{4}$
	To winnowing Ditto at 1d.	0 0 7 $\frac{3}{4}$
	To one Year's Rent at 18 Shillings	0 9 0
		<hr/>
		1 19 2 $\frac{1}{2}$
	To neat Profit	1 4 4
		<hr/>
		3 3 6 $\frac{1}{2}$

* When these Oats were sown, they were sold for 10
and 11 Shillings a Barrel.

† I pay this Man 12d. a Day.

Per

Per Contra.	Cr.
-------------	-----

		l. s. d.
1767.		
Sept. 7.	By Produce of Oats, 7 Barrels, 11 Stone, at 6s. 10d. *	2 13 2½
	By Produce of Straw, 13 Hundred, 3 Quarters, 7 Pounds, at 9d.	0 10 4½
		3 3 6½

* I sold these Oats at 6s. 10d. a Barrel, which was a good Price, for the Year,

B

Dr.

Dr. Half an Acre of Ground under Oats in the Common Husbandry, once ploughed, according as the Expence arose, in the second Year of the Comparative Experiment.

		l. s. d.
1767.		
Mar. 26.	To ploughing once,	0 5 2
27.	To feed Oats, one Barrel,	0 10 0
	To the Seedsman,	0 0 6
	To the Harrowing, Horses, and Driver,	0 2 3
		<hr/>
		0 17 11
Sept. 7.	To reaping,	0 3 3
	To thrashing 6 Barrels, 9 Stone, 7 Pounds, at 5d.	0 2 10
	To winnowing ditto, at 1d.	0 0 6 $\frac{1}{4}$
	To one Year's Rent, at 18 Shillings,	0 9 0
	To heat Profit, A	1 13 6$\frac{1}{4}$
		1 0 3$\frac{1}{2}$
		<hr/> 2 13 10 $\frac{1}{4}$

Cr.

Per Contra. Cr.

		l. s. d.
Sept. 7.	By Produce of Oats, 6 Barrels,* 9 Stone, 7 Pounds, at 6s. 10d.	2 5 7½
	By Straw, 10 Hundred, 3 Quarters, 24 Pounds, at 9d.	0 8 2½
		<hr/> <hr/>
		2 13 10½

* Fourteen Stone, fourteen Pounds to the Stone, make a
Barrel of Oats in *Ireland*.

The Advan-
tage of twice
ploughing
for Oats
proved.

Thus we see, that twice ploughing for Oats, fully answers the Expence, because we have, after paying that additional Expence, a superior Profit upon the half Acre twice ploughed, of four Shillings and an Half-penny, and consequently eight Shillings and one Penny upon an Acre.

The Far-
mer's Ob-
jection.

However, although this appears to be an Advantage worthy the Farmer's Attention, because eight Shillings additional Profit upon an Acre of Ground, will help greatly towards his Rent; yet, upon Land, which is inclinable to throw up Grass, the Farmer will argue, and I think not without Reason, that he gains that Profit by his Cattle pasturing from his Wheat Harvest, until Spring upon the Wheat Stubble.

An Impedi-
ment to
twice
ploughing
for Oats too
general.

And it too generally is the Case, that almost every Occupier of Land, undertaking too much for his Capital, and Strength of Cattle, he cannot plough his Wheat Stubbles in Autumn, for his succeeding Crop of Oats, even where the Ground will not afford him an adequate Profit by the Grass which might otherwise rise, if the Land were good.

In what Ca-
ses twice
ploughing
should not
be omitted.

But where the Intention of the Occupier shall be to lay down his Ground, either with Clover, or for Meadow; I earnestly recommend that he plough the Wheat Stubble in Autumn, although the Ground should be inclinable to Grass; and if possible, plough and harrow it twice in the Spring for sowing, for which the Spring Crop will abundantly pay; besides which, he will find great Benefit from it in his Grasfs, be it of what Kind it may; for Grass Seeds, as well as Corn, flourish the better, for the Ground being well reduced at the Time of sowing.

And in Order to support this by Experiment, as well as to ascertain how far the Drill Culture impoverishes Ground.

The Me-
thod of
treating

I have a field, now under a Crop of Drilled Wheat, which is the fifth Drilled Crop in Succession, upon

upon the same Ground. And, in Order to compleat Land which
the Proceſſ, and thereby to shew that this Culture is to be laid
does not impoveriſh Ground, like the Common Hus- down for
bandry, I intend to lay this Field Meadow. Meadow.
next Spring. And to compleat it properly, I intend
to plough it very deep, as soon as the present Crop
comes off, Water cut it as carefully as if it were
under Corn, that it may lie dry during the Winter,
and to plough and harrow it twice in the ſucceeding
Spring, for Oats and Grass Seeds, by which I ſhall
expect excellent Meadow, although it is not grassy
Land in nature. See my Report for the Year 1764,
Page 2 to 13, where it will be found how this Field
was treated; and for the Quality of the Land, ſee
the ſame Report, Page 39, 40, 41.

In order to carry on our Comparative Account of Profit and Loss, between the Drill and Common Husbandry of the two Acres in question, I am now to compare the Produce of Oats already mentioned, with the Produce of Drilled Wheat for the past Year.

From what I have already ſaid, respecting the Objeſtions and common Impediments to the twice ploughing for Oats, it is more than probable, that the Practice will not, and in many Cafes cannot be adopted. But notwithstanding that, I ſhall, (in order to give the Common Husbandry every Advantage, as I have always done before, in the Course of this comparative Experiment) first take that Method in my comparative Account againſt the Drill Culture, as producing the greater Crop, and confequently the most Money.

We have already ſeen, that our *half Acre* of Ground under Oats, which was twice ploughed, cost one Pound nineteen Shillings and two Pence half-penny, and produced three Pounds three Shillings and six Pence half-penny, which we muſt now double, for our comparative Account, in order to have Acre againſt Acre, which will make our comparative Experiment ſtand as follows, for the past Year.

	l. s. d.
To neat Profit upon an Acre of Drilled Wheat in the second Year, —	5 11 5
To neat Profit upon the Oat Crop of the common Husbandry, in the second Year of the Experiment, —	2 18 8
Superior Profit in Favour of the Drill Culture	<u>2 12 9</u>

In stating the preceding comparative Account, the warmest Advocates for the Common Husbandry, must admit, that I have given that Husbandry great Advantage, by taking the Crop which was obtained from twice ploughing the Ground for Oats against the Drilled. But now let us examine the Matter in another Way.

We have seen the two Experiments upon the Acre of Ground for Oats distinctly stated. I shall now state them together, as one Crop, and compare that with the Produce of the Drilled Acre.

	l. s. d.
Half an Acre under Oats, twice ploughed, produced a neat Profit of —	1 4 4
Half an Acre under ditto, once ploughed, produced, —	1 0 3½
	<u>2 4 7½</u>

If we compare this Sum with our Profit upon the Drilled Acre, the superior Profit of that will be three Pounds six Shillings and nine Pence half-penny, instead of two Pounds twelve Shillings and nine Pence, as already stated.

But what seems to be yet a fairer Comparison, if we adhere strictly to the Practice of the Common Husbandry is, to suppose the whole Acre devoted to that Culture in this Experiment, had been but once ploughed

ploughed for the Oats, which, in that Case, would stand thus.

The Acre of Ground devoted to the Common Husbandry; sown with Oats in 1767, after once ploughing the Ground, after having produced Wheat in the Year 1766, afforded a Profit of two Pounds and seven Pence, as already stated, Page 20. Out of the Profit arising from the second Crop of Drilled Wheat, as already stated in Page 12, viz. five Pounds eleven Shillings and five Pence, we are to deduct this two Pounds and seven Pence, which will leave a superior Profit, in Favour of the Drill Culture for the second Year of three Pounds ten Shillings and ten Pence, instead of two Pounds twelve Shillings and nine Pence, as already stated, in Page 24.

For the clearer Information, as well as Choice of the *candid* Reader, I shall now state the comparative Account for the two past Years, in two different Ways. The first, by giving the Common Husbandry the Advantage of twice ploughing for Oats; and the second, supposing the Ground to be ploughed but once, as is the common Practice.

Dr. One Acre of Ground, under the common Husbandry, for two Years, as the expence arose, the Ground being twice ploughed for the Crop of Oats.

1766.	l. s. d.
Sept. 29. To the Expence upon an Acre of Wheat, as stated in my Report, 1766, p. 22.*	4 1 8
1767.	
Sept. 29. To the Expence upon an Acre of Oats, upon the same Acre of Ground, which produced the above, the same having been twice ploughed for the Oats † —	3 18 5
To clear Profit in two Years —	<hr/> 8 0 1 <hr/> 16 9 10 <hr/> 24 9 11

* The Reader will recollect, that this Wheat Crop, was not charged with a Year's Rent for fallowing, nor with the Expence of making a Fallow, and for the many other Advantages given to it, in this comparative Experiment, I refer him to my Report for the Year 1766.

† See Page 15.—where the Account is only stated for Half an Acre, but in stating this comparative Account we must suppose the whole Acre to have been twice ploughed, and therefore we must double the Expence, as on the Credit Side, I have the produce.

*Per Contra.**Cr.*

1766.

Sept. 29. By the Produce, see my Report for the
Year 1766, Page 23 — —

l. s. d

18 2 10

1767.

Sept. 29. By the Produce, as stated in Page 18,
with this Difference, that in stating this
Account we must double the Sum, as
our Calculation is for an Acre, instead
of Half an Acre. — —

6 7 1

24 9 11*Dr.*

Dr. One Acre of Ground, under the common Husbandry for two Years, as the Expence arose, the Ground being once ploughed for the Crop of Oats.

1766.	<i>l. s. d.</i>
Sept. 29. To the Expence upon an Acre of Wheat, as stated in my Report for the Year 1766, Page 22,	— — — 4 1 8
1767.	
Sept. 29. To the Expence upon an Acre of Oats, upon the same Ground, which pro- duced the above Crop, the Ground be- ing but once ploughed, see Page 20;	3 7 1½
To clear Profit in two Years	<hr/> 7 8 9½ 16 1 9 <hr/> 23 10 6½

Dr. One Acre of Ground under Wheat in Drills for two Years.

1766.	<i>l. s. d.</i>
Sept. 29. To the Expence upon an Acre of drilled Wheat, as it arose in the first Year, and stated at large in my Report for the Year 1766, Page 20,	— — — 3 5 1¼
1767.	
Sept. 29. To ditto on the second Crop, see Page 12,	2 11 6½
To clear Profit in two Years	<hr/> 5 16 8 15 2 10½ <hr/> 20 19 6½

Per

Per Contra. Cr.

	l. s. d.
1766. Sept. 29. By Produce, see my Report for the Year 1766, P. 23,	— — — 18 2 10
1767. Sept. 29. By the Produce, as stated in P. 21, which must be doubled for the same Reason as it is on the other Side	— — — 5 7 8½ — — — 23 10 6½

Per Contra. Cr.

1766. Sept. 29. By the Produce, see Report 1766, P. 21,	12 16 7
1767. Sept. 29. By Ditto, see P. 12,	— — — 8 2 11½ — — — 20 19 6½

Thus

Thus it appears, that if we take the Account, in which the Acre under the common Husbandry is supposed to have been twice ploughed for Oats, that in the two Years, that Culture exceeds the Drill in Point of Profit, £. 1 6 11 $\frac{2}{3}$: But if we take the Account, in which the Ground is supposed to have been ploughed but once, in that Case, the common Husbandry, for the two first Years, exceeds the Drill, in Point of Profit, only 18 Shillings and 10 Pence three Farthings. But if we value the second drilled Crop, at what it really sold for, i. e. 30 Shillings a Barrel, instead of 25 Shillings, in that Case, the drill Husbandry will afford the larger Profit, by 16 Shillings and 9 Pence Farthing, altho' we take the larger Profit of the common Husbandry against the Drill, notwithstanding the many other advantages which have been given to the former, in the Course of this Experiment.

The drilled Acre was again sown with Wheat, for the third Year, in October, 1767, and is the 5th drilled Crop upon the same Ground, without Interruption*.

In this Place, I shall just beg Leave to inform the Society, that as some People might imagine, so small a comparative Experiment as two Acres not a sufficient Trial of the Merit of the drill Husbandry; and whereas a Story has been very basely propagated, that I had highly manured the drilled Acre, and had not manured that under the common Husbandry at all, see the Preface to my Report 1766, Page 3, where that Falsehood is confuted.

In order fully to answer the Expectations of the Society, I have far exceeded their Order of the 25th of July, 1765, for I have sown a Field of 20 Plantation Acres, half under the common Husbandry,

* In the Year 1764 Turnips, 1765 Barley, 1766, 1767 and 1768 Wheat.

dry, and the other half in Drills, corresponding with the above Order in every Respect, except that of exceeding the Request of the Society, by 18 Acres; and upon this 20 Acres of Ground I used no Manure at all of any Kind, neither does any Man of the Neighbourhood, that I can learn, remember any Manure ever being put upon this Field; and I have had it under a common Course of Tillage for five Years, and I am told it has been under Tillage for 60 Years.

The Corn under both Methods of Culture is allowed by all Persons who come to see it, to be the best they have seen this Year.—

In another Field, which is the 5th drilled Crop in Succession upon the same Ground, I have sown three Species of Wheat, in order to ascertain by Experiment, which is the most profitable Corn for the Farmer to propagate: And in the sowing this Field, I did not divide the Ground into three Parts; but I began on one Side the Field, and finished on the other, by sowing with the first Sort every third Ridge, and in like Manner I sowed the two other Kinds, so that the three Species of Corn stand in alternate Rows through the Field.

I have also, in another Field, sown six Kinds of Turneps in the same Way, giving each Kind an equal Chance of Ground in Point of Quality.

These are some of the Experiments which I have depending this Year, of which I shall give an Account next Spring.

Some

Some Account of a Fly which attacked the Wheat in the Year 1767, the Manner in which it injured the Corn, how the Insect disappeared, and its destructive Progress interrupted.

The Fly,
when first
seen.

In the Month of July, 1767, I was walking with a Gentleman in my Fields who came to see my Corn, &c. to whose Speculation and Ingenuity I am obliged for the Discovery of a Species of Fly, which was at that Time preying upon the Grains of Wheat.

The Destruction which these Insects made in the Corn, induced me to be very attentive to them for a Fortnight, during which Time they increased exceedingly, and so in Proportion the Corn suffered, in every Field I had that Year.

My Wheat of the Year 1767 was injured by small Flies; and I had that Year above eighty Plantation Acres.

The Fly de-
scribed.

These Flies are of a very small Kind, about $\frac{7}{8}$ th of an Inch long, but their Diameter so small, that it is not easily ascertained; I suppose scarcely $\frac{7}{8}$ th of an Inch: Their Wings are Black, and their Bodies of a lighter Colour.

How they
destroy the
Wheat.

They make their Way without any apparent Wound in the Hull, or Chest which contains the Wheat, and post themselves next the Grain, within the Hull.

They perforate and consume the Grain, whilst in its sappy or milky State; and in its Place deposit their Maggots, which are shielded by the Hull from external Injury, until their Generation is compleated, and in Proportion as the Weather is warm and dry, so they increase and multiply exceedingly.

The

The certain Indication of the Corn being damaged by them is, that the Ears, in Part, will look Yellow, when other Parts of the same Ears will look Green; where the former Complexion appears, let the Hulls be opened by touching the Points carefully, without breaking them off, and not only the Flies will be seen, but the Maggots will be found where the Grain had been, in a little Cluster, and of a pale yellow Complexion.

When the Day is warm, dry, and calm, by looking attentively, an infinite Number of the Flies will be seen upon the Ears of Corn, and upon the Stems of the Ears to which the Hulls are united; but more upon the latter than upon the former, for Nature seems to direct these Insects to be very careful how they expose themselves; for during the Fortnight in which I gave very close and daily Attention to them, it was very seldom that I could discover any of them to venture a Passage upon the Wing from one Ear of Corn to another, tho' doubtless many of them did; but they are so small that they pass imperceptibly, unless the human Sight approaches them very nearly.

Happily for Mankind these Flies cannot survive heavy Rain; for in a Fortnight after I first saw them we had Rain, which totally destroyed them, at least for what I could see, for I saw them no more that Summer.

I apprehend, the Position they place themselves and their Maggots in, renders them very liable to Destruction by Rain, for the Chests, or Hulls, covering the Grains of Corn, will hold a certain Quantity of Water like a Cup, and I conclude the Flies and Maggots therein perish by drowning: And the Flies, which are on the Outside, seeking Admission into other Ears of Corn, are beat down and destroyed by the falling Rain, as Bees frequently are in their Passage Home to their Hives.

An

An Experiment on the sowing Oats to stand the Winter, compared with sowing the same Corn in the Spring ; and some other comparative Experiments on different Kinds of the same Grain, under different Methods of Culture.

Much has been said in the Recommendation of the sowing Oats in the Month of *October*, to stand the Winter ; and as my Undertakings are calculated for the Information of the Publick, I considered this as an Experiment which I ought to attempt ; particularly, as some Gentlemen requested I would, altho' I was at the same Time fully assured of the Impossibility of its being carried into general Practice, for Reasons which I shall offer presently.

In the Month of *October* I sowed with the Drill Plough half an Acre of one of the Fields mentioned in my Report for the Year 1764,* with a Species of Oats which I shall describe presently : 'The Corn came up extreamly well, and had a very fine Colour, with great Luxuriance, until the Month of *January*, when we had a pretty smart Frost, which continued for some Time.

This Frost affected the Oats exceedingly, for the Plants turned quite Yellow, looked as if they had been singed with an hot Iron, and appeared as if they were dying.

The Frost was followed by Snow, which lay some Time upon the Ground ; and this was succeeded by Rain. When the Snow disappeared, I really imagined my Oats were in a Manner destroyed, for they had lost the fine and rich Appearance which they made before the severe Weather, and now were very thin in

* And is the same Field mentioned in Page 22, and Page 31, in this Report, to be now under the 5th drilled Crop.

in every Part, but particularly where the Water lay moist.

This gave me but an unsavourable Opinion of this Attempt ; however I let them remain, and as soon as the Ground was dry enough to admit the Horse Hoe, I introduced it, and gave this Corn the Spring-hoeing.

Soon after, the Plants which remained alive, shot up surprizingly, and really were of such a Size as I had never seen before ; they were more like green Reeds than Oats, and, until the Corn shewed itself, every Person who saw it, were at a Loss to pronounce what it was, for the Stems were much stronger than Wheat, which it was imagined to be until after it had shot.

In the same Field, I sowed in the Spring, the same Quantity of Ground in Drills with the same Kind of Oats : And also, the same Quantity of Ground with the common white Oats in Drills likewise ; and the same Quantity of Ground in the Broad-cast or common Way, with the common Oats.

The Purpose of these Experiments was calculated to compare the different Species of Corn, the Winter and Spring sowing, and the different Methods of Culture.

I have so fully described the different Operations in the drill Culture, in a former Publication, that I need not here say more, than, that all the Experiments in Drills received three Horse hoeings except the Winter Oats, and that Experiment received a Winter hoeing, exclusive of the Spring and Summer hoeings.

Respecting the Winter Oats, such as had perished were not to be recovered, but such as survived the Severity of the Winter flourished much beyond my Expectations, and were ripe three Weeks sooner than my Spring Oats which were sown in the same Field.

The Corn was such as I had never seen before, the Grain was large and heavy, more like Bere than Oats,

Comparative Experiments on Oats.

and the Produce was 5 Barrels 11 Stones and 6 Pounds.

Had not the Crop suffered by the Frost, Snow and Rain of the Winter, in the Manner already described, and the natural Wetness of the Land, the Crop must have been much greater; but even at what it did produce (which we see was at the Rate of 11 Barrels 8 Stones and 12 Pounds to the Acre) I think it a good Crop, abstracted from the Circumstance of the Corn being so much better in Point of Quality, than any Spring sown Oats can be.

How much this Corn would have produced in the Market more than Spring sown Corn I cannot say, because I gave it all away for Seed to Gentlemen who saw and admired it.

The half Acre which was sown in the Spring in Drills, with the same Sort of Corn, produced 5 Barrels 12 Stones and 10 Pounds, which was at the Rate of 11 Barrels 11 Stones and 6 Pounds to the Acre.

The half Acre sown in the Spring in Drills, with the common white Oats, produced 5 Barrels 10 Stones and 12 Pounds, which was at the Rate of 11 Barrels 7 Stones and 10 Pounds to the Acre.*

And the Half Acre which was sown in the common Way, with the common Oats, produced 6 Barrels 1 Stone and 3 Pounds, which was at the Rate of 12 Barrels 2 Stones and 6 Pounds to the Acre.

Thus we see that the fat Oats, sown in October, was little inferior in Point of Produce (altho' they suffered much as hath been mentioned) to the same Oats, sown in the same Manner in the Spring, and was much better Corn: And we see that the fat Oats produced more than the common Oats sown in the same

* This Crop is something short of Mr. *Lovinge's*, which is particularly related in my Report for the Year 1765, p. 72. Way;

Way; but that the common Oats, sown in the common Way, produced something more than any which was sown in Drills; which still confirms what has appeared by our former Experiments, viz. that upon Ground equally prepared the common Husbandry will produce the most Corn for one Crop. And I hope the Reader will please to remember, that I have never taught him to expect as great a Produce from the drill Culture as from the common Husbandry, for one Crop, where the Ground shall have been *equally prepared*: But the Advantage arising to the Tiller of Land in the drill Husbandry, we are taught to expect, will arise from the Succession of Crops upon the same Ground, by the Cheapness of the Culture.

And as some Support thereof, here it may not be improper to inform the Reader, that the Field which was devoted to this Set of Experiments has been under a Succession of drilled Crops, ever since the Year 1764, and is now under drilled Wheat, as mentioned in Page 32, where I describe three Species of Wheat to be sown in alternate Rows: But the Part of this Field which was sown with Oats, in the common Way, is under Grass, as that could not be restored to the drill Culture without a Year's Preparation.

Some Account of, and Observations upon, the Oats already mentioned under the Name of FAT OATS.

This Species of Corn, from what I can collect, has not been long in this Kingdom; for I am informed that a Gentleman near Kells found a few Grains of it in a Barrel of Foreign Flax Seed, which he bought in Dublin a few Years ago. From the extraordinary Size of the Grain he was induced, by a laudable Spirit of serving the Publick, to cultivate those few Grains carefully in his Garden, and from thence he introduced them into the Field, until he possessed himself of such a Quantity as to dispose of them to others; so that now, from one Hand to another, they are in the

Some Account of the Fat Oats.

Possession of many Gentlemen and Farmers, in the Counties of *Meath* and *Kildare*, and in many distant Parts of the Kingdom, to whom I have sent them.

How they came by the Name of Fat Oats I cannot say, unless they have been so called from their great Size.

I am sorry that my Experience of these Oats, will not admit of my recommending them to the Culture of the Farmer; but the Objections which have arisen in my Experience of them, are as follow,

The Skins of them are very thick, and what is still worse, I found, upon closely examining the Grains, that there is a small Grain, almost enveloped by the large one, which greatly contributes to their Quantity of Hulls, and Diminution of Meal, when they come to the important Experiment of Drying and Grinding, for the Purpose of making Oatmeal.

For I sent three Barrels of these Oats, of the Spring Crop, and the like Quantity of common Oats, which were also raised in the Drill Way, from the Spring sowing, to the Mill, in the Charge of a careful man, and when the Meal was obtained from each Kind, through the same Sieve, the common Oats yielded rather more than the fat Oats.

But even this Experiment, if there were no other Objections, should not discourage the sowing these Oats, because, if the Crop with any Certainty could be saved, the Increase would be incredible, and therefore would abundantly answer in point of Profit; but the great misfortune is, that if they stand until they are properly ripe, the Cultivator may lose the greater Part of his Crop, by a sudden Squall of Wind; and at last, if he escapes that Accident, they will shed extravagantly in the reaping, binding, gathering, drawing, pitching, ricking, &c. So that by the time they come to the Hand of the Tresher, an infinite deal of the Corn is lost.

With

With an hope of obviating this Inconvenience, I reaped some of mine, which grew in another Field, before they were thorough ripe, but I found that did not answer; for when they had lain upon the Ledges to dry and ripen, they shed even then, and besides that, the Grain was poorer; and if, after cutting them in this State, they are not suffered to lie long enough upon the Ledges, to wither the Straw and harden the Corn, the former will heat when stacked, to the great Injury of the Grain.

Another great Inconvenience which attends this Species of Corn, is, that it seldom ripens together, for some of it will be green, when other Parts of it, immediately joining, will be so ripe as to shed.

And what seems to render it a Kind of Corn not fit for the poorer Sort of common Farmers, is, that it requires rich Ground and good Tillage; the former few are possessed of, and the latter much fewer practice.

But when good Ground, sufficient Tillage, and a command of Hands in the Hour of Harvest, are in the Power of the Farmer, accompanied with Care in handling the Corn, (in the many tedious Times in which it is to pass the Hand, before its Value can come to the Pocket of an anxious Slave of the Country, to answer the Call of his Landlord, and the many other Demands which are upon him) in that Case, the Crop will be very great.

But I have experienced such extravagant Waste attends the Cultivation of this Species of Corn, that I have disposed of all I had of it, and if I do not change my Mind, I shall never sow it again.

At the same Time I must admit, that the Corn is very inviting to any Man to cultivate, upon seeing and handling of it; and if any Method could be contrived to save it without shedding, I am persuaded the Produce would be greater than any other Species of Oats can afford, that I have seen.

Considerations upon the sowing Oats, &c.

But there is yet another Objection to this Species of Oats, which arises in the Straw, for that makes very indifferent Fodder for Cattle in the Winter.—It is Brittle, Dusty, and Dry, which I apprehend arises from the Heat, which comes upon it, on Account of some of the Straw being unavoidably Green, when the Corn is cut.

Considerations upon the sowing Oats to stand the Winter.

From the Experiment already related, we see that better Oats are obtained, by sowing them as a Winter, than there can in sowing them as a Spring Crop; but we see, that they suffer by Frost, Snow, and Rain, in the Winter. I think it is very probable, that if the Ground be a warm and dry Soil, they will suffer much less.

But I do conceive, besides that of the Land being dry, it should also be rich; and I am willing to believe, that if, in the Months of November and December, Sheep were turned into the Field, and suffered to graze the Oats close to the Ground, that it might be a Means of preserving the Roots greatly, from the Injury they sustain from the Frost, Snow, and cold Rains of the Winter, which generally commence in this Kingdom, in the Months of January and February.

My Reason for supposing that grazing the Corn will contribute to its Preservation, is, that I apprehend when the Blades of the Corn are destroyed by the Severity of the Weather, as already mentioned, that as Putrefaction comes upon them, they communicate the same Disease to the Roots, and from thence, as I conceive, we sustain the Diminution of our Plants, as already mentioned.

Now, what is the End proposed in sowing Oats as a Winter Grain? The Answer will be, in Order to obtain better, and more Corn, and that earlier than the Spring Sowing will afford.

It

It seems necessary to enquire, why the Winter sowing should have those Effects.

Plants, in Proportion to their Age, send out Roots, and in Proportion to the Number of those Roots, more or less Food is brought Home, for the Sustenance of the Trunk or Body of the Plant, and its dependant Parts, be it of what Kind it may ; the Quantity of that Food, and Quality in Point of Crudeneness, being always governed by the Texture, or Pores of the Plant.*

The Oats then, being sown five or six Months before the usual Time, have Leisure to take firm Possession of the Ground by the Roots, before the severe Weather comes on which appears to affect them most. Such of the Plants as survive that Severity, having already got firm Possession of the Soil, begin to move in Vegetation as early in the Spring as the Season will admit of, whilst the Spring Oats are not yet, perhaps, committed to the Ground ; but in this early Effort to vegetate, we do not find that it is the Autumn Growth which is shooting forward, but that it is New and Spring shoots, which are rising from the surviving Roots, whilst those of the Autumn Growth are decayed and decaying.

I submit then, upon these Considerations, whether it does not seem to promise Preservation to the Roots, if we turn Sheep on to eat the Blades which shoot up before the severe Weather comes on, rather than let them perish, whilst in contact with the Roots, which, as I before said, I do apprehend communicates Putre-

* The Oak, although much stronger, yet, from its firm Texture and small Pores, takes much more delicate Food, than the Sally ; and, therefore, the latter grows much faster than the former.—The Manner of Plants feeding, and what is their Food, is a Point which has been much controverted ; and, therefore, I mean not to enter upon that Subject, unless I shall live to publish a systematical Work, in which Case I shall, without Dread of the learned in Scientific Principles, (because I am sure, they will read and judge impartially) give my Sentiments upon Principles not yet attempted.

Considerations upon the sowing Oats, &c.

faction to the Roots, and by which I incline to believe they perish.

But let it be remembered, that I form this Judgment from the Experiment I made, which was upon Ground apt to retain the Wet of the Winter, as most of my Land does ; and therefore more susceptible of Frost than dry Land can be, for Reasons so obvious that I need not describe them ; and therefore my Winter Oats must have suffered more than I think it is probable they will, when sown upon Land naturally dry, unless *hard Frost immediately follows very heavy Rain.*

If any Man who shall sow Oats as a Winter Corn, should put in Practice what I have suggested, of pasturing the Oats with Sheep, I beg to be understood, that I mean the Sheep to be turned on, when the Land is dry, and on no Account when it is wet.

Wheat and Oats are the two capital Grains for the Sustenance of Man and Beast ; the rest may be classed in the Tribe of Luxuries, at least from the human Manufacture and Use of them,

Of a Piece with His other innumerable Indulgences to the Animal Creation, how wisely and how kindly has our Creator, adapted the Culture of these two capital Species of Corn, to the Convenience, and to the Power of Men !

For the sowing of Wheat, He has given us an whole Year to prepare the Land, and allowed us a Season of two Months for committing it to the Ground ; and that this might not be interrupted by Oats ; *the inferior Grain*, He has as generously to us, created them in such a Manner, that they are to be sown in the Spring, and six Months perfects their Generation, so that they become Food fit for Man and Beast.

Human Invention has thought of subverting this Order, by sowing Oats as a Winter Grain ; and we find, where the Corn survives the Winter, that it produces

duces finer and better Corn, than when sown in the Spring ; but notwithstanding that, I am apprehensive it will be found a precarious Culture at best : Besides which, it can never come into an extensive Practice much less a general one ; for in the Course of my Observations, I have generally seen that the Farmer, particularly in this Kingdom, always has enough to do, to get his Wheat into the Ground, without thinking of sowing his Oats in the Wheat sowing Season.

And further, as soon as ever his Wheat is sown, he ought to be breaking his Fallows, for his next Wheat Crops ; but it too generally is the Case, that his poor, little, half-starved Cattle, are over-wrought by the Wheat sowing, and his Fallows remain unbroken, until after his Spring Corn is sown ; hence his Wheat Crops are miserable, and he remains in Poverty.

Where a Gentleman or Farmer, chuses to have a few extraordinary good Oats, for any favourite Cattle, and that he has Ground suited to the Purpose, and every other Convenience, in such Case a few Acres may be sown, with some Hopes of Success ; great Care being taken to let off the falling Rains of the Winter, by carefully Water-cutting the Land.

I have dwelt longer upon the Subject of Oats than I intended, when I entered upon it, and I hope the Reader will indulge me a little further, in behalf of the poor Cottager, commonly called Cotters here, who, according to the Custom of this Kingdom, are engaged to their Master for the whole Year, at certain Wages, be the Hire of additional or supernumerary Men what it may. From the Master they hold a little Cabbin, and generally an Acre of Ground. To this poor Laborer, it is of the utmost Consequence, for the Bread of himself and his Family, that his Garden should be sown early ; but that it is generally so incompatible with the Business of the Master, that the poor Man's Garden remains unsown with Oats (for Oats and Potatoes are the general Crop) until the latter End of April or the beginning of May ; nay,

Experiments on Lucerne.

nay, I have seen them sowing Oats in the middle of May. Hence these poor Creatures are too often disappointed in their little Crop; consequently their expected Stock of Provision for the ensuing Year is diminished; and if the master has Inhumanity enough to be deaf to their calls for Food, they must suffer that Hunger, which produces that Countenance of Sorrow and Misery, which I have too often seen in the Laborers of particular Persons, and in particular Districts, instead of that Countenance of Health, which is natural to a Country Laborer, when he is fed.

As much as may be, to remove this too general Suffering of this Kind of Poor: I earnestly recommend to Gentlemen and Farmers, who employ Men in this Way, that they furnish them with the *Rotterdam, Polish, or Freizland* Oats, to sow their Gardens; because this Kind of Corn, will admit of being sown much later than the common Oats, and although sown late, they ripen in good Time: But if not cut when they are ripe, they are apt to shed; but as the Quantity of Ground which these poor People hold, is but small, the Humanity of the Master should induce him to furnish them a little Assistance, when their Corn is ripe. By such Assistance, the Advantage will be mutual to him and his Servants; they will be benefited, and he will have the Consolation of, at least, being entitled to their Gratitude.

Experiments on Lucerne.

In my Report for the Year 1766, I was so full upon the Culture of this Plant, that I have no Occasion to enter upon those Particulars here; and therefore I shall only now relate how much my *Field Plantation* of transplanted Lucerne produced in the Year 1767, and which was the second Season since putting down the Plants, and close, for the present, with the two important Objects, of feeding dairy Cows with Lucerne, and making it into Hay.

For

For the Quantity produced from this Field Plantation, in the Summer of 1766, which immediately followed the putting down my Plants, I refer to my Report for that Year, Page 49.

The same Row, being 649 Feet long, which had been cut and weighed in the preceding Year, produced in the Year 1767, as follows,

	C.	Q.	lb.
May the 12th,	—	—	1 3 7
July the 6th,	—	—	2 2 7
August the 21st,	—	—	1 3 24
October the 1st,	—	—	1 2 27
			8 0 9

The above Quantity being produced from one Row, 649 Feet long, and three Feet being the Distance between each Row, a Plantation Acre will contain thirty-six and a Quarter of those Rows, and therefore our Produce is in the Proportion of 14 Tons, 12 Hundred, 3 Quarters and eighteen Pounds, to the Acre; and that, in the second Summer only, after putting down the Plants.

I receive more Pleasure from this Produce, than I shall describe, because it far exceeds the Produce of our small Experiments in the second Year, (as will appear by referring to my Report for the Year 1765, Page 22, and Report 1766, Page 46, where the Produce of each Year is stated,) and is a very inviting Proof of the Value of this Plant, because we have a greater Produce in the Field, in the second Season, by the ruder Culture of the Horse and Plough, than we had in our small Experiments, managed with the Spade.

Indeed, our Field Plantation has the Benefit of a better Exposure, as I formerly mentioned, than the small Experiments had. Our former Experiments proved

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proved that to be an Advantage, and this Field Experiment confirms it.

We perceive, that our second Cutting in a Season, affords the greatest Quantity, because the Weather is then warmer, and the Days longer, than at any other of the Times of Cutting during the Summer ; and in Proportion as the Days shorten, so our Crops diminish : This seems to shew, that this Plant would throw off prodigious Crops in our West-India Islands, where the Inhabitants are much distressed, as I am informed, for Pasture to feed their Cattle ; and I am willing to believe, that *there* Lucerne might be raised to great Advantage in the broad Cast Way, because natural Grass, as I am told, grows very slowly in those Islands, on Account of the great Heat ; and therefore the Lucerne would not be annoyed thereby, as it is in these colder Climates.

Experiments on the feeding Dairy Cows with Lucerne.

In my Report for the Year 1766, Page 53, I made some Calculations upon the feeding Dairy Cows with Lucerne ; but as these Calculations were presumptive, I considered it as incumbent upon me, to try the Experiment as early as I should have it in my Power.

The Field Plantation of transplanted Lucerne, just now mentioned, furnished me that Opportunity, and accordingly I put it in Practice last Summer, to have it with *certainty* in my Power to inform the Society and the Publick of the Consequences, as well as to ground my Calculations of what may be expected from Lucerne, upon Matters of Fact.

In the Report already mentioned, Page 53, I did suppose a Cow would not eat more Lucerne in 24 Hours, than 56 Pounds, because, by a former Experiment, see my Report for 1764, Page 94, I found that a very

very large Horse eat in one Night 49 Pounds, and as I concluded a Cow would not eat more than an Horse, I therefore allotted 56 Pounds to a Cow in my former Calculation.

To ascertain the Fact, I last Summer bailed up two of the largest Cows I have, and began to feed them with Lucerne, depriving them totally of every other Kind of Food.

I began, by giving each Cow seven Pounds at a Time, and so repeated it every first and second Hour, directing the Man who had this Business in Charge, not to give more than fifty-six Pounds to each Cow in the Day. Thus we went on for two Days, and the Cows devoured their Allowance, without the least Waste.

At the Expiration of that Time, I apprehended the Allowance insufficient, and then ordered the Man to give each of them fourteen Pounds more in the Day. We proceeded thus for two Days longer, and yet the Cows appeared to want more.

I then ordered a second Addition of fourteen Pounds more to each Cow, and even this Allowance they eat up clean.

The Man, who was really very careful and attentive to this Business, said he thought they would yet eat more, although each Cow was now allowed three Quarters of an Hundred, every twenty-four Hours.

Accordingly, I ordered him to give them as much as they would eat, still weighing of it; but instead of seven Pounds at a Time, I directed him to lay it before them fourteen Pounds at a Time, until he had given them Half an Hundred, and then to proceed with only seven Pounds at a Time, until the last Time of foddering them in the Evening, and then to give them fourteen Pounds at ten o'Clock at Night. We proceeded thus for three Days, and each Cow consumed

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med every Day 105 suttle Pounds; a Quantity which I own surprised me.

However, in the Pursuit of this, we found some Waste, and consequently I reduced the Quantity afterwards, and gave three Quarters of an Hundred weight to each Cow, every Day, for three Weeks, which I found to be a sufficient Quantity.

The Cows fretted pretty much at not being let out with the other Cattle, which made them look a little thin, for the first Week or ten Days; but they gave a great Quantity of Milk, which was exceeding good.

But I did not find that additional Excellence in the Flavor, which some Writers have spoken of; and I shall be allowed to be a Judge of the Flavor of Milk, as other Men are of Wine, because I have, in Purchase of Health, made Milk my principal Liquor for some Years past.

At the same Time that it does not give any additional good Quality in Point of Flavor, yet I consider it an Excellence, that this Food does not give the Milk any Flavor, that it can be distinguished from that of Cows fed upon common Grass, not mixed with offensive Plants, of which there are many.

The Day on which I put up these two Cows to feed upon Lucerne only, I turned two other Cows into a small Meadow, as I did not consider their remaining upon the common Pasture fair, for my future Intention of making Butter from their Milk, to compare with that of the Cows to be fed with the Lucerne, and therefore I devoted a choice little Meadow to this Experiment.

The Milk which was taken from these four Cows, for the first four Days was mixed, indiscriminately, with that of the other Cows, because I apprehended the Food which the Cows now to be fed with Lucerne, had eaten before, might otherwise be incorporated

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rated with their Milk for that Time, and thereby dis-
appoint my Enquiry.

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But after that Time, the Milk of the Cows fed with
the Lucerne, was kept by itself, as was that of the
Cows feeding upon the Meadow. After a proper
Quantity was obtained, Butter was made of each Kind
distinctly.

That I might not suffer my Palate to be influenced
by my favorable Opinion of Lucerne, I desired a Pat
of each Kind of Butter with a private Mark, to be
brought to Table at Breakfast; and they were so nearly
the same in Point of Flavor, that I could by no
Means distinguish any Difference, both Kinds being as
good, I think, as ever I tasted.

During the last Week of this Experiment, I sent
some of the Lucerne Butter to some Gentlemen in
Dublin, who admitted it to be as good as they had
eaten of.

Thus I have divested Lucerne of all those additional
Excellencies, which disingenuous Writers, and garran-
teer Farmers attribute to it as miraculous; and rest the
Merit of this Plant, principally, upon the great Quantity
of Food which it will afford by a proper Culture, of
which I endeavoured to give pretty full and clear Di-
rections in my Report for the Year 1766, Page 55.

This being the first Time in my Life, that I ever
attempted to feed horned Cattle with Lucerne, it may
be observed by the small Quantity I gave at a Time,
when I began the Experiment, that I did it cautiously
in Point of Quantity, because Mr. Tull has said, that
Lucerne will swell horned Cattle: A Disease so dan-
gerous to this Species of Animal, that it behoves
every Man to be very cautious how he admits his Cat-
tle to feed upon any Plant which will have that Effect
upon them.

This

This Consideration led me to be very circumspect, as this is a Malady by which I have already suffered, * and therefore with an Hope of avoiding this Injury to my Cows ; the Day before I began the Experiment, I had such a Quantity of Lucerne cut, and left in the Field, as I apprehended would supply the Cows for the next Day, and thus I went on for about ten Days, cutting on the preceding, what was imagined would serve them in the succeeding Day, and no apparent Swelling appeared in the Cows.

Thus far my Experiment succeeded to my Wish : But, however, I considered the publick Information, as to this Point, not yet compleat, and therefore, for theirs, and my own Satisfaction, I was induced to extend the Experiment yet farther.

And consequently, I ordered the Quantity which one of the Cows was to consume after twelve o'Clock in the Day, to be cut as it was to be given her, until the Approach of Evening, and that what she was to eat then, should be cut before the Dew fell upon it. This Method was pursued for two Days, and the Cow appeared very well.

Hence I was led to Hope, that no Injury would arise to the Cow, let me cut the Lucerne when I might.

Accordingly, I ordered her Allowance to be cut immediately before the Hours of laying it before her, and she eat it very freely ; but towards the Afternoon, we imagined she began to swell a little, and towards the Evening she was considerably swelled. Upon this I ordered her to be turned out, and attended myself to see her drove about, and in about half an Hour she discharged her Excrement, like that of Cattle turned into Grass in the Spring ; by this, the Swelling abated, without any other Operation, and the Cow was

* See my Report for the Year 1764.

returned

returned to the House, and received her Allowance of Lucerne, which had been cut the Day before.

I proceeded with this Cow the same Way the next Day, and she swelled again, and the same Method removed it. A third Day I repeated it, the like Effects appeared, and the same Remedy had the like Success.

Not yet quite satisfied, apprehending perhaps, that this Effect of the fresh cut Lucerne, might be constitutional in this Cow, which is a young one in Comparison of her Companion, I was induced to try the same Experiment upon her, repeated in the same Manner, in giving her the Lucerne; and she swelled also, but not near so much as the other, and as I did not value her (the older one) so much as I did the former Cow, I was determined yet to extend the Experiment further, well knowing, that in Case of Necessity, I had the Remedy in my Hand by the Knife *, and therefore I did not turn her out at all, but kept her bailed up, still plying her with her Allowance regularly, which she continued to eat; and at length the Swelling abated in the Intervals of giving her the Lucerne, and rose again, when she had eaten her Allowance, and thus I went on for several Days; the Cow suffering no apparent Injury, other than that I imagined the daily Swelling, began to make her look a little thin. This was very material, and therefore we had recourse to the former Method of cutting the Lucerne the Day before she was to eat it.

The Swelling which attended this Cow, not being accompanied with Danger, added to the Circumstance of the other Cow, which underwent the same Experiment, and was relieved by being drove about a little, induces me to believe, that where Cattle shall be al-

* See my Report for the Year 1764, where the Manner of Stabbing Cattle which are swelled by eating Clover, &c. is described. And I am to-add, that since that Publication, I have practised that Method with Success, where Cattle have been swelled from other Causes.

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lowed to pasture upon Lucerne in the Field, no Danger will arise to them, provided, upon their being first turned in, that they shall be full of Common Gras, and that, for the three or four first Days, they shall be allowed to Pasture upon the Lucerne, only for a few Hours in the Middle of the Day, *that being Dry*, and continue this Practice, until they begin to purge; in that Case, I do believe, no Inconvenience will arise to the Beast. The Advantage to the Farmer or Dairy Man I shall shew presently.

The Reader, who shall not be acquainted with the Nature of this Disease of Horned Cattle Swelling, by eating this Gras, may, perhaps be deterred from the Use of it, if he has read what I have said in my Report for the Year 1764, respecting Cattle being swelled by the eating Clover. But to abate any Apprehensions of Danger, which he may conceive, I am to inform him, that I have had my Cattle as much swelled, by the eating Meadow Grass, when cut and brought to them, in their Bails, as these Cows were by the Lucerne, in the second Stage of my Experiments, if I may be allowed so to distinguish it. This Practice of keeping Horned Cattle bailed up at Night, and Feeding them with mown Gras, promises many profitable Advantages to every Occupier of Land, but more particularly to those who wish to improve with Expedition, and to make their Pasture hold out longer, than it can do in the common Method of pasturing Dairy Cows and running Stock; but I do not mean to enlarge upon this Subject here, as my Experience of it, has not yet furnished me with that accurate Information, which I wish to communicate to the Publick, upon so material a Point, and therefore I shall postpone the saying more on that Head, to some future Opportunity.

The Experiments already related, so clearly shew the Effects of Lucerne upon Horned Cattle, that it is quite unnecessary for me to make any Observations upon the Practice, as the Effects shew the certain safe Method of giving this Gras to them; and therefore, I shall

shall now proceed to shew the Profits which may arise to the Cultivator of Lucerne.

*Calculations upon the Produce of Lucerne,
and how many Cattle it will maintain,
founded upon the foregoing Experiments.*

In my Report for the Year 1766, I made some Calculations, to ascertain how many Cattle it is probable an Acre of Lucerne, producing thirty-four Tons would maintain.

In those Calculations, I presumed a Cow would not eat above fifty-six Pounds in twenty-four Hours, the preceding Experiments shew, that I was much mistaken in that Supposition, since Practice hath shewn, that a Cow will eat much more, and therefore our former Calculations must be incorrect, though the Reader will please to remember, that I made great Allowances in the Close of that Calculation. See Report for the Year 1766, Page 54.

Our former Experiments have also shewn, that Lucerne cultivated in Drills, will, in the third Year, produce above thirty Tons of Pasture from an Acre. See Report 1766, Page 44. And that transplanted Lucerne will produce above thirty-four Tons. See the same Report, Page 45.

Upon the Produce of the transplanted Lucerne, I shall therefore make my Calculations, because our Experiments have incontestibly proved that to be the best Culture, and for the Practice, see my Report for 1766, Page 55.

Thirty-four Tons, twelve Hundred, two Quarters, being the Produce which may certainly be expected from an Acre, in and after the third Year, the Rules and Methods recommended in the above-named Report, being observed and executed in the Cultivation;

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upon

Calculations upon the Produce of Lucerne, &c.

upon that Produce, and the Quantity which our preceding Experiments have already shewn, a Cow will consume, we shall now ground our Calculations.

The repeated Experiments which I have now made in this Climate for four Years past, have shewn, that Lucerne will be fit to cut in the Beginning of *May*, and that it will afford successive Crops, until the Beginning of *October*; and consequently, that our Cattle may therefore be fed upon Lucerne in the House, for five Months; but if they shall be allowed to pasture upon the Lucerne they may begin about the Middle of *March*, and finish in the latter End of *October*, which will be seven Months; but a Knowledge of the Profits from the latter Method, must arise from an Experience, which nothing can shew, but a more general and more extensive Culture of this Plant, than has hitherto been in Practice; and therefore I shall confine my Calculations to the Method which I practised in the past Year.

To proceed then, our Quantity of thirty-four Tons, twelve Hundred and two Quarters, being reduced to Pounds, it will appear that a Plantation Acre of Land, even such as mine *, will produce 73080 Suttle Pounds, which being divided by 84, that being the Quantity which our Experiments have shewn a Cow will eat in twenty four Hours, our Answer will be 870, which are the Number of Days, which the Produce of an Acre would maintain one Cow.

As our Lucerne is in Profit for cutting, only about five Months, we shall now examine how many Cows an Acre will maintain for that Time.

The Experiments already related, having shewn 84 Suttle Pounds to be the proper Quantity for a Cow in twenty-four Hours; that being multiplied by 6, the Answer will be 504, which are the Number of Pounds that six Cows will eat in twenty-four Hours,

* For its Quality, see Report 1764, P. 39.

that

that being the Divisor of 73080 Pounds, which is the Quantity our Experiments have shewn an Acre to produce, the Answer will be 145, which are the Number of Days that one Acre of Lucerne will maintain six Cows, that is five Calendar Months of the Summer, wanting seven Days.

To pursue the Mode of Calculation, upon the certainty we now go, which I pursued last Year presumptively, I shall suppose twelve Calves to be put upon those six Cows; and that at a Year old, they shall sell for fifty Shillings a Piece, that would amount to thirty Pound. May we not reasonably value the Summer Keeping of them at half the Price they will fetch?

In that Case, our Acre of Lucerne will afford a Profit of fifteen Pounds a Year, out of which we are to deduct the Sum of two Pound nine Shillings and six Pence, which is the annual Expence upon an Acre of transplanted Lucerne *, which will leave a neat Profit of twelve Pound ten Shillings and six Pence.

Although I have valued the Calves at only fifty Shillings a Piece, yet, if they are of a good Kind, they will sell for three, four and five Pounds an Head, in Proportion to their Size and Shapes, which depends entirely upon the Conduct and Spirit of the Breeder, in the first Purchase of his breeding Cows and Bull, the latter of which I earnestly recommend both Attention and Spirit in the Purchase of, for I have experienced, that a midling Cow will bring an handsome Calf from a good Bull, and that a good Cow will bring but a poor Calf from a bad Bull.

Besides the Profit arising, as already stated, in the two last Months, the Cows may spare a good deal of Milk from the Calves, as the latter will then feed upon Grass; and over and above these Profits, a great

* For the Particulars, see my Report for the Year 1766, Page 52.

Lucerne made into Hay.

Quantity of Dung will be made, to enrich the Land of the Farmer or Breeder.

And to conclude, let every Man consider how advantageous this Grass must be to every Occupier of Land, when it is well known, that one Acre of good common Grass will do no more than maintain one Cow for the Summer; from this Method, it appears that the same Quantity of Ground will maintain fix, for the moderate annual Expence of two Pounds nine Shillings and six Pence.

An Experiment on the making Lucerne into Hay.

The French have such a Scarcity of what we call Common Grass, that they make Lucerne into Hay, and the Writers upon Agriculture in France, enlarge greatly in the Recommendation of it, as a Winter Fodder, both for Horses and Horned Cattle.

The Culture of it in these Kingdoms, has been so little practised, that I have never yet known any Gentleman or Farmer who has made it into Hay.

Our Experiments have shewn that a great Quantity of Fodder may be obtained from an Acre of Land, provided the proper Care be taken in the Culture.

But even with that, I have never been able to bring my Lucerne, to produce any Thing like the Quantities which the Writers already mentioned, give us an Account of; perhaps as mine becomes older, more may be obtained than I have hitherto had.

Some Persons, who may be invited into the Culture of Lucerne, may, perhaps, rather be inclined to make Hay of it, than to convert it to the Uses which I have already calculated upon; and therefore I have, for the Information of such, made an Experiment upon

upon the making it into Hay, by which the Waste is ascertained; and thereby we can pretty accurately calculate how much Hay may be expected from an Acre of Lucerne in a Season, provided the Whole shall be made into Hay; which I would not recommend, for Reasons which will appear presently.

Last Summer I cut one Hundred, one Quarter and thirteen Pounds of green Lucerne, which I laid carefully upon a Grass Walk, and had it made thoroughly into Hay; after which it was weighed, and then there was no more than one Quarter, sixteen Pounds and an half; by which it appears, that the Waste in Drying was something more than *three-fourths*; this I consider as a great Deal; but what Proportion it bears to the Waste upon Common Grass, when made into Hay, I cannot tell; however, I shall inform myself of that Particular, in the ensuing Summer.

We have already seen, that the Produce of Lucerne from an Acre, will be 73080 Suttle Pounds. If we divide that by the Quantity, viz. one Hundred, one Quarter and thirteen Pounds, or 181 Pounds of green Lucerne, which I made into Hay, our Answer will be 404, wanting only 34 Pounds in the Acre. This Number, *i. e.* 404, being multiplied by the Quantity of Hay produced, *i. e.* 1 Quarter, 16 Pounds and an half, or 44 Pounds and an half; our Answer will be 17978 Suttle Pounds, or 8 Tons and 58 Pounds of Hay from an Acre, which is above 40 of our Loads.*

Every Man is so well acquainted with the Value of Hay, and the Price varies so much, from many Causes, that I shall not put any Value upon this; it being a sufficient Satisfaction, that we see an Acre of transplanted Lucerne at, and after, three Years old, will produce above forty Loads of Hay, which I believe is four Times the Quantity, produced by the Bulk of the Meadows in the Kingdom, and I believe twice as

* Four Hundred weight is a Parliamentary Load of Hay in *Ireland*.

Lucerne made into Hay.

much as the highly manured Meadows near the Metropolis, or the rich Lands of Munster.

On the other Side, I just now said, that I would not recommend the whole Produce of Lucerne in a Season to be made into Hay. My Reasons are, that the latter Crops cannot be so conveniently made into Hay as the two first, because we have not always sufficient Sun to do the Business, but in the Months of *May*, *June*, and *July* we have, and therefore I recommend (where Hay shall be the Object) the Crops of those Months to this Purpose, and the latter Crops to the Purpose of Feeding Horses or Horned Cattle in the House.

We have seen that our Quantity of Hay will be above forty Loads to an Acre; but whether the Quantity shall be more or less, depends upon the State which the Lucerne shall be in, at the Time of Cutting, for if it be suffered to stand until the Lucerne be in full bloom, in that Case, the Waste in Drying will be less, and consequently, the Quantity of Hay more, but if cut just as it begins to blossom, or before, so in Proportion the Waste will be more, and the Hay less.

For Coach Horses, and other useful working Cattle, the first Method will be best, but for the pretty delicate Creatures which are intended for the Turf, the Lucerne should be cut when full of Sap, for the Purpose of making Hay, by which it will retain its fine Green Colour, and will be very fine Hay.

A SHORT

A S H O R T
DESCRIPTION and LIST,

With the PRICES of the
Instruments of Husbandry,

M A D E I N T H E
F A C T O R Y

A T

*Laughlinstown near Celbridge, in
the County of Kildare.*

Established and Conducted
By Mr. JOHN WYNN BAKER,

Under the Patronage and Encouragement of the
Right Honorable and Honorable DUBLIN SOCIETY.

The Third EDITION, with large Additions and Amendments.

D U B L I N :

Printed by S. POWELL, for the AUTHOR.

A N D

Sold by G. FAULKNER, at the Corner of *Parliament-street* ; and the PRINTER hereof, in *Dame-street*.

M DCC LXIX.

INTRODUCTION.

To the R E A D E R.-

WHEN I began this Factory, I had no Conception that the Demand would, in many Years, be equal to the Calls which have been, in the short Time since its Establishment, and therefore the Plan was originally calculated upon a small Scale. The unexpected Demand, I am sorry to observe, proves the Want of good Instruments for all the Branches of Agriculture in this Kingdom. Sensible of this Inconvenience, the Gentlemen who generously, in Behalf of their Country, bend their Attention to that *Support* of every other Science and Manufacture, have heretofore been importing Instruments from such Parts of the World, as they have imagined could best supply them. But from a real Want of an Establishment of this Kind, for the making all Kinds of Instruments for Husbandry, the Importation of useful Ones has not answered the laudable Purposes of the Importers; at least the Instruments have not been so generally introduced, as every Man of generous Sentiments must believe to have been the Intention of the Importers; for when they have been landed, they have been immediately carried to the Neighbourhood of the Importer, and at best, brought into Use only in that particular District; so that if a good Instrument should, by this Means, be introduced in the *North*, the *Scutb* could receive no Benefit from it, and so *vice versa*; from which Cause the general Introduction of good Instruments must have been slow. But when we add the Consideration of an Unwillingness in Mechanicks to make from the Patterns

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Patterns so imported, and what is quite as inconvenient, a Want of Men to shew the Use of them, it is not to be wondered at, that Tillage is in no better State in *Ireland*, than it is in many Parts of *England*, where it is, from the same Causes, in as bad a State, I believe, as in any Part of the World; at least, any Part which pretends to the Practice of Agriculture. From the latter Cause it has too often happened, that Instruments of real Use have been thrown aside, neglected, and abused, until they became unfit for the Use of the most experienced Hand.

It was conceived, that if a Factory were established, for making Implements of Husbandry, it would be a Means of dispersing throughout the Kingdom, Variety of Instruments of the best in their Kinds; but that alone would not have done, if the Maker had not a competent Judgment in the Use of them, and a Notion of constructing such new ones as have been wanting, and improving such as have been defective. How far I have answered that Expectation of my Patrons, I shall submit to the candid Consideration and Experience of the Public.

Many Persons have, heretofore, made and executed a single Machine of particular Construction, and that with Success to themselves and the Publick. But I believe, I am the only Person, who has ever attempted, to execute Machines, for every Branch of Agriculture, or that can be useful in the Busines and Pleasure of a Country Life.

How far this Attempt has been attended with Success, I shall not presume to describe; but appeal to the Approbation of the Publick, in their Use of the Machines, and the Demand I have had; for in about two Years, I have sold to the Amount of one thousand six hundred Pounds worth of them.

How far the Publick must be benefited, by such a Variety of Models, in their full Proportion, being dispersed over the Kingdom, from which others are daily making,

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making, without the Trouble of calculating their Scantling and Iron Work from Scales (for which the common Run of Workmen are by no Means qualified) I submit, to the Consideration of the Candid.

Reflecting, upon what must be the Sentiments of such; I feel some Consolation, amidst the Care, Application, Anxiety, constant Exercise of Mind, great Expence, and the severe Consequences of the Misfortune I sustained, in the Prosecution of this Undertaking; hitherto, without any Benefit, to myself or Family.

For I can truly say, that I have ever been much more ambitious, of acquitting myself, to the Satisfaction of the Publick, thereby to reflect Honor to my Patrons, than I have thought of Emolument to myself.

An Enthusiasm, perhaps, not sufficiently tempered with Prudence.

However, at that I shall not repine, but whatever may be my Fate, I shall endeavour to Heal the Consequences, with the comfortable Consideration, that I have acted diligently and faithfully, in the Trust committed to my Care.

And I hope I shall be pardoned for believing, that my Factory has already prevented the Importation of many Machines for Agriculture, and put *Ireland* in Possession of several useful Ones, which are to be found in no other Country.

Had this Factory been established in any remote Part, its Effects could not have been diffused through the Kingdom, as I believe, the Demand will shew them to be. Had it been established immediately in the Metropolis, it would likewise have been less effectual; I am willing to believe, than it has been in its present Situation; for this plain Reason, that the mere

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mere looking at the best Machines for the Manufacture of Land, could not be sufficiently persuasive of their Importance and Use, unless the Management of them in the Field, or, at least, the Effects of their Operations could be seen. The Situation, being not beyond a Morning's Ride from *Dublin*, gives all People, from every Part of the Kingdom, who are occasionally brought to the Metropolis by other Calls, an Opportunity of examining, not only into the Nature and Quality of the Machines, but the different Methods of Husbandry carried on with them. The Reports of such as have been here, have induced others, not only to come when they happen to be in *Dublin*, but what must be conceived as more grateful to me, to undertake Journeys of more than an hundred Miles, on Purpose to spend some Days with me. It will hardly be necessary for me to say, it could not be from any personal Acquaintance, because it is well known I am a Stranger here; but from a Zeal in the Cause of Agriculture, which, I have the Pleasure to observe, is peculiar to the Gentlemen of *Ireland*.

I must be allowed to say, that I have frequently, since the Commencement of this Undertaking, felt great Concern that it has not been in my Power to give so general a View of the different Machines I make, as I wish to do, to those who come on Purpose to see them: but it will be considered, that as fast as they have been finished, they have been sent away, because the Demand has always exceeded the Possibility of Execution; besides which, I really have not Buildings to keep an Assortment in; a Point which I am exceedingly anxious to obtain, for the speedier Dispatch of the Orders, and the greater Convenience of the Public.

And I hope it will not be looked upon as extraordinary, that I am not equal to the erecting such Buildings as are necessary to the conducting so great a Work as this is now grown; when it shall be considered, that it is very little more than two Years, since the Building which I had erected for a Part of this Under-

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Undertaking, my Dwelling-House, Materials, and Part of my Furniture were consumed by Fire. And indeed, were it ever so compatible with my Circumstances, I know not whether it would be altogether so prudent, to lay out a large Sum of Money, for carrying on a Work, in which the Public are much more interested than I can possibly be as an Individual; for I believe it is a well-known Fact, that many Machines which are purchased of me, are intended only as Patterns for others to work by; a Circumstance, which calls for Circumspection and Caution on my Part, in the Opinion of many. These Considerations, added to the unhappy Event of the Fire, *which came upon me by this Undertaking*, had almost persuaded me to decline this Factory; but when I re-considered who were my Patrons, and the Country I was serving, I could not harbour a Doubt, but my Labours and Misfortune would, at the proper Time, obtain the friendly Interposition of those, who will consider them candidly and generously. Still animated with these Hopes, I have persevered in the Re-establishment of this Undertaking, at an Expence, and under Difficulties, which Timidity and Diffidence would tremble at.

But although my Instruments and Methods of Husbandry are passing into many Parts of the Kingdom, with a Rapidity, which the greatest Vanity on my Part could not have expected; yet, should I live, to be by any Means enabled to carry my Undertakings for the general Improvement of Agriculture in *Ireland*, to that Extent, which, what I have done, assures me is infinitely wanting, I do flatter myself, that a very few Years might be productive of this Kingdom's obtaining the first Character in the Article of Tillage, which will necessarily pave the Way to Perfection in every other useful Art, as the Neglect of it, must, on the contrary, be attended with the most fatal Consequences both to the Affluence and Honor of the Nation. But I shall defer saying more upon the extending my Plan till another Opportunity.

In

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In the Prosecution of this Undertaking, I have been frequently called upon for Leather Harness, and have endeavoured to get it done in the best Manner that the Workmen in that Way could do it, but as I never could get any done to my Mind, or a Workman who knew how to do it, in the best *English* Manner, although I frequently advertised for one, I have often, where I could do it, declined receiving Orders for Leather Harness. But notwithstanding that, the Demand has still increased upon me, insomuch, that I have been obliged to renew my Endeavours to obtain a perfect Workman in that Branch, and have lately got an *Englishman*, who I find upon three Months Trial, is a compleat Workman, in the making all Kinds of *English* Harness for Ploughs, Waggon, Carts, Coaches, &c. and therefore, I have, after examining minutely into the Expence of every Article, added all Kinds of Leather Harness, both elegant and plain to my List of Instruments, which will appear in their proper Place, to be ranged in such a Manner, as I hope will be intelligible to all Persons who may have Occasion for any Thing in that Branch.

I shall now endeavour to give a short Account of the Uses of some of the Instruments named in the following List, every one of which I have numbered, for the more convenient Reference of the Reader.

A short

A short Account of the Uses of the Instruments, referring, by the Numbers, to their Names, and the Description of their Parts in the List of them hereafter given.

MY former Publications have shewn, that the Instruments for the Drill Husbandry are calculated only for that particular Species of Culture; and therefore I shall take no other Notice of their Uses in this Place, than just to say, that for the Information of those who may adopt that particular Husbandry, I have ranged the necessary Instruments together, that they may appear at one View, under the Heads, N°. 1, 2, 3, 4, 5, 6, and 7, in the List.

N°. 7. Contains an Account of the necessary Harness for the using these Instruments, the Bulk of which it is to be presumed, most People have; those who have them not, will please to order them with the Machines, otherwise they will not be sent.

N°. 8. Is a Drill Plough, to which I have given a Place in my List, because I have met with some Persons who have conceived an high Opinion of that Species of Husbandry, for which that Plough is calculated. My Sentiments upon *that Practice* of the Drill Culture will be found in my Report for the Year 1766, Page 38.

N°. 9. Is a Plough which has been found to answer all the Purposes of the breaking and manufacturing Fallow of any Kind; the Draught has been found easy to the Cattle, and the Plough, from the Manner in which it is fortified with Iron in every Part subject to Distress, is rendered irresistible, save, that the Coulter, Sock, and Ground-Plates, from the constant Friction in the Soil, must wear, and therefore will sometimes want repairing. What recommends this Plough very much to the Practice of the common

E Plough-

The Description of the Uses of the

Ploughman is, that it approaches the Plough he has been used to, more than any other I make, except the Chip-Plough, No. 10, which I cannot recommend the Use of to any Man, because the Chip is never large enough to take a Share with a large Socket, by which Means all Chip-Ploughs are apt to break off behind the Sock or Share; whereas, my Socks are made large in the Socket, and are always put upon the Point of the Crofs.

The Plough, No. 11. is calculated for throwing up the last Sod, in sowing Wheat under the Plough in small Ridges, in order to bring the Furrows narrow in the Bottom; and which I believe answers the Purpose very well, though I have not used it myself, for Reasons which will appear presently. See No. 15, in the List.

No. 12. Is a Plough for the Purpose of skinning Ground for Burning; and I have the Pleasure to understand, that this Plough has compleatly answered the Purpose to those who have used it. I shall just be allowed to say, that the Burning some Kind of Land is undoubtedly a very good Practice, upon its first Improvement; but in other Cases it is altogether as bad a Practice as can be introduced. See my Hints upon Husbandry, published by Mr. Flim in Castle-street.

No. 13. Is a Plough calculated for two Horses, said by some People to be capable of the first breaking, and compleatly manufacturing any Ground for Fallow. I must dissent from that Opinion, because I am sure there is much more Land which two Horses cannot effectually break, than there is which they can. To support this Opinion, of two Cattle being sufficient to break Land in general, shallow plowing is recommended as a general Practice, a Practice so contrary to all Principles, that it is hardly worth answering. But let any Man *carefully* examine the Roots of the Plants which are in the Farmers Department, and he will find, that they pass a great Way into the Soil, if the

the Tiller will, by proper Tillage, allow them to do so ; but if he will only just skin the Surface, particularly in a strong Soil, he must not expect the Roots of small annual Plants to penetrate in Search of Food, where he has not introduced his Coulter and Share to a proper Depth ; and with the Strength of two Horses he cannot ; though I defy any Man to hurt this Plough, as I make it, with four, by fair Work. But if, from a Plan of Oeconomy, the Farmer wishes to introduce this Plough, he certainly may do it to Advantage, after he has deeply broken his Fallow, and well reduced it by the Harrow, provided he does not let it remain too long to consolidate. And if, by this Saving, he can be prevailed upon to add one more ploughing than usual, he will undoubtedly find his Account in the Use of these Ploughs in the manufa&turing his Land ; but 'till he can be dispossessed of the inconsistent Notion of its being possible to make his Land *too fine*, I fear we shall not introduce the Extra-ploughing. The established Method of not exceeding four Times ploughing Fallow, is founded in Ignorance ; every Fallow should be ploughed, until it is well reduced to receive the Seed.

Nº. 14. Is the Lomax-Plough for four Cattle, to draw double, and is such a one as Practice has induced many People to approve, I having sold many of them ; but every common Ploughman does not like them so well as they do the one I mentioned before, Nº. 9, neither are they, indeed, so fit for *stony* Land, as that, but in every other Respect, answer all the Purposes of compleatly working Fallow.

Nº. 15. Is the Plough which I have called, in my Report for the Year 1766, p. 40, the *Seeding* Plough ; in the Use of which the Farmer will find many Advantages : But I shall say no more in the Recommendation of it, than to refer him to the Report already mentioned, and leave his Experience to examine the Merit of the Instrument, in the sowing Corn under the Plough. I before said, when I was speaking of the Hunting-Plough, Nº. 11, that for Reasons which

The Description of the Uses of the

would appear presently, I never had used that Plough ; which are, that I find this Plough answers all the Purposes of *that* and the four Horse Ploughs, which are used for the *sowing* or rather *burying* Wheat. Some indeed, who pay Attention to their Tillage, have very properly had two of these seedling Ploughs, which, with one four Horse Plough, I call a Set of Ploughs for the common Husbandry. The two small Ones are the one wider and the other narrower in the Sole : The latter of which always follows the wider one, and clears up the Huntings, by which the Work goes on mathematically ; whereas, it would be inconsistent, in finishing the Ridges, to have the wider Plough following the narrower. A Point not sufficiently attended to in the general Construction and Use of Ploughs.

Nº. 16. Is a Plough of the same Kind, to be worked with only one Horse, either in the Field or Garden, which I think may very advantageously be introduced in the Field for sowing Corn under the Plough in broad Ridges, provided the Land be first *well manufactured*.

Nº. 17. Is a large strong Plough, calculated, at the particular Request of some Gentlemen, for the ploughing very deep, by a great Strength of Cattle, and those who have had them, have been kind enough to inform me they answer compleatly. Unhappily for me, I cannot use them in my Soil, the Quarry being too near the Surface.

Nº. 18. Is a Plough which is calculated for keeping Land flat in its Tillage ; I presume first introduced on very dry Land, the better to retain Moisture, in which, I have no Doubt, but that it may answer ; and it has also been introduced for the Purpose of laying Land flat, which is intended for Lawns and Meadows. I shall not enter into the Merits of this Instrument, further than to say, that I have endeavoured to divest it of the Wheels, by which to render it a *cheaper*

cheaper and less complicated Machine, than it can be when worked with a Carriage.

Nº. 19. Is a Plough, which Mr. *Tull* sensibly calculated for the speedier Reducement of Ground; but the Draft of it is no less heavy than its Expence; and at the Time he invented this Plough, the Scarificator, Nº. 27, had not been thought of. But as we are now in Possession of that Machine, which will so effectually cut the Ground into Slips or Strings of three Inches broad, that by preceding the four Horse Ploughs, Nº. 9 or Nº. 14, a little while before the Ploughs begin to turn the Land, all the Purposes of Mr. *Tull's* four-coulted Plough will be answered.

Nº. 20, and 21. Are Wheel-Ploughs, which, from my Observations upon their Operations, I conceive cannot be so effectual in general Use, as Ploughs without Wheels, for this plain Reason, that as the Wheels are the Gauge for the Depth of the Plough, wherever they meet with any Thing which raises them, the Plough consequently rises so as to work shallow, and sometimes not to touch the Surface; at other Times, when the Wheels sink into any Declivity, the Plough immediately sinks in Proportion, so that the *Ploughing* is rendered irregular by those Kind of Accidents, and will continue to be so until the Ploughs have been at Work upon the same Land for some Years. Another Consideration against them is, that they are in general complicated, and not a little expensive.

Nº. 22, 23, 36, 37, and 41, are Sledges and Truckles for various Purposes. I shall only just add, that I wish it were more generally the Practice, to introduce Sledges for removing our Ploughs and Harrows from Field to Field than it is; for by the too general Manner of removing them, they often receive more Injury than by a Month's Work; besides which, the Cattle are too often hurt.

The Description of the Uses of the

N^o. 26. Is an Instrument, calculated for the Purpose of marking out Drains with strait Edges, in order to save the Expence of that Part of the Work being done by a Spade and Line, which is attended with Delay; and the Machine is so constructed, that the Drain may be marked out from sixteen Inches to two Feet wide, at Discretion. Where large Quantities of this Kind of Work is to be done, the Machine will save considerable Expence; but where the Quantity of Work is but small, it will be an unnecessary Purchase.

N^o. 27. Is the Scarificator mentioned before, when I was speaking of Mr. Tull's four-coultered Plough, to which it will be a very useful Substitute: and as to its other Purposes, I refer the Reader to what I have said of it, in my Report for the Year 1765, Page 41, &c.

N^o. 28. Is an Instrument which I built upon the two preceding ones, in order to lessen the Expence to those who may have Occasion for them both, and which I have the Pleasure to observe, operates compleatly in either Case.

N^o. 29. Is calculated for sinking Ditches by the Strength of Horses, after they are laid out, in order to save Spade Work; but after the Ditch shall be sunk, the Sides, it will be imagined, must be dressed by the Spade. This Plough has also been found very useful in sinking Potatoe Furrows, which saves the Labour of the second Spitting, and reduces the Soil at once to the Command of the Shovel. It has also been found useful in deepening the Furrows, for the second covering of the Corn by the Shovel.

N^o. 31 to N^o. 41, both inclusive, are Harrows of different Kinds; Instruments so universally known, that I need not say more of their Use, than just to observe, that the Harrow, in general Use in this Kingdom, is too often ineffectual in its Operation, by its being

being made only in *one* Frame ; but by mine being made in two Frames, united together by what I call coupling Bolts, they lie close to the Ground, * even in irregular Places, and therefore, I flatter myself, fulfil the Purpose of the Machine, namely, harrowing ; whereas, the Harrow which is made with one Frame rides all rising Places in the Field, and consequently passes over hollow Places very frequently. The triangular Plough-Harrow, N^o. 32, is indeed an Exception to this Observation, because it consists of only one Frame ; but then this Instrument is made in a particular Manner in the Pins, to *bite* the Ground, (if I may be allowed the Expression) because the Operation of it is diametrically opposite to that of the common Purpose of Harrows ; for this Instrument acts like a Miner, under the Surface, the others act above it. And, indeed, the very *Name* which I have given this Instrument seems to indicate, that it is to act somewhat like a Plough, as well as an Harrow. This Instrument is wonderfully powerful in reducing Ground, clearing Weeds, Stubble, &c. and is really easier in its Draught, than would be imagined by looking at it.

N^o. 42 to 53, both inclusive, are Waggons and Carts of different Kinds. Were I to enter into a general Description of their Construction, it would swell this Paper greatly beyond the Bulk of what I intended ; and therefore I shall only beg Leave to inform the Reader, that I have given very particular Attention to the Improvement of this Kind of Carriages ; and I have the Pleasure to think, that the Demand I have for them, is as strong an Indication as I can have, that in the Judgment of others, I have not been unsuccessful in that Attempt.

* I have an Harrow for reducing Ground, of quite a new Construction now in Hands, and before my next Publication, shall try it ; and if it answers my Expectations I shall give it a Place in my next List.

Some Considerations upon the Construction of the Two Sorts of CARS in general Use, throughout this Kingdom; with a Description of One of a new Construction, N^o. 54 and 55, calculated to carry greater Burthens, and with much more Ease and Safety to that generous Creature, the Horse.

The Lowness of the Wheels of an Outside and Inside Car.

THE Advantage which is apprehended to be gained by the Lowness of the Wheels of common Cars, is said to arise, from the Weight of the Load, pressing them forward. And yet, I have generally observed, that the greater Weight of the Load is put on before the Wheels, and that entirely in loading Stones. Hence it should seem, that if the Weight of the Load, does at all contribute to the Motion of the Wheels, instead of its contributing to their Motion *forward*, it must on the contrary, press them *backwards*. And the lower the Horse, the greater will be *that Effect*. But to be mathematically full upon this Head, would require more Room, than the intended Bulk of these Considerations will admit of.

The Friction upon the Gudgeons of an Outside Car.

The Gudgeons are in Contact with the Bolsters, which are always *Wood*, and therefore the Friction must be more laborious to Cattle, than when in Contact with Metal or Brass. Besides, the Bolsters are generally about four Inches broad, and therefore bear four Inches upon each Gudgeon, which must still cause a greater Resistance, by an Increase of Friction. Whereas a small Spok Wheel, when *properly bung*, will not have a Friction of more than an Inch and an half, and that will be lessened by its being Steel against Metal or Brass.

Inside Cars
their Friction.

The inside Car is yet a more laborious Carriage to Cattle, because the Friction in that is between *Wood* and *Wood*, which is in Contact *eight and ten* Inches. The Axis is of Timber made round; and the Sides of the Car are laid upon that. To prevent the Axis wearing

wearing in the Place of Friction, it is often stuck with Nails. I have lately seen a few Instances, where the Axis has been covered, in the Place of Friction, with Cast Mettle, which is an Amendment.

Both the Carriages of this Kind, and which are Wheels, the common ones of *Ireland*, have their Wheels made how made, of Plank, commonly called *Block Wheels*. Through and how these Wheels pass the Axis, which is of Wood, and the Axis fixed upon generally about four Inches *square*. The Wheels have a *square Mortice* made through them to receive the Axis upon which they are *firmly wedged*.

The Consequence is, that the Axis must always turn with the Wheels: And one Wheel cannot turn independant of the other. Hence follows infinite Distress to Cattle.

For when the Carriage is to turn short, as soon as the Point on which the Horse presses at his Shoulder, forms an acute Angle with the Wheels, the Wheels cease to turn, for they immediately drag. The Horse is obliged to exert all the Power he has against this Resistance; which in this Operation is *Sideways*, and therefore he is deprived of at least half his Power, in the very moment, in which he wants an Exertion of the greatest he has, to conquer the natural Obstruction of the Machine. But if Straw, stiff Dirt, or a Stone, meet the Wheel which should go forward, the Horse actually stops, and cannot move the Carriage, till the accidental Obstruction be removed.

And this Effect arises, in turning either of the Carriages named. The Body of the Carriage is frequently racked and broken, and the Horse often falls.

The Block Wheels in deep Roads, collect and carry with them great Quantities of Clay, which very soon come in Contact with the Car Sides and Inside Back, by which the Horse is infinitely distressed, and at last will be obliged to stop, unless an unmerciful and giddy Driver force him on, until he falls by Drawing,

The Description of the Uses of the Drawing. Careful Drivers are much interrupted in their Journies, by removing these Obstructions, which frequently require a good Deal of Labour.

In drawing Hay Home, the outside Cars are often stopped by a Collection of Hay between the Wheels, Sides, and Gudgeons, which take so much Time to remove, that I have often had Delay, Irregularity and Interruption ensue, in the drawing Home Hay, and which the Farmer must often have experienced.

Another Cause of Friction.

The Ends of the Axis to an outside Car, come so nearly in contact with the Sides, that there is a continual Friction between them. In turning the Carriage, the Ends of the Axis immediately lock firm against the Sides. All tending to the Distress of the Horse.

The new Car.

Having thus shewn the Inconveniences which attend the Construction of the common Cars, I shall now shew how far I have endeavoured to remove them, in the Construction of the Cars, named in the following List, N° 54 and 55.

Why the Form of the common Car was adhered to as much as could be.

I apprehended a Carriage which adhered, as closely as might be, to those in common Use, would be most likely to make its Way into general Use.

First, as to the Objection made to the Friction in the common Cars, I have endeavoured to lessen that in this Carriage, by Iron Arms, steeled; running in Metal Boxes, touching in each Wheel, only about an Inch and an Half.

The one being Steel, and the other Metal; both hard Bodies; it is apprehended the Friction must be considerably less than in a common Car; and consequently the Resistance lessened at equal Weights.

Why Brass Boxes were not chosen.

Brass Boxes would have been chosen, were it not, that it is apprehended they would be too dear for the lower People.

The

The Height of the Wheels exceed those of a common Car only about six Inches: But notwithstanding that, the Body of the Carriage is raised, by the Manner of hanging the Wheels, which will appear in the Machine. The Reason for which is, to bring the Shafts why. as near upon a strait Line as may be, to the Point of Draft in the Horses Shoulder; whereas, in the common Cars, the Points of the Shafts (commonly called the Sides) are so high, caused by the Lowness of the Wheels, that when the Draft is from the Points of the Shafts, the Shafts, and Point of Draft in the Shoulder of the Horse, form an obtuse Angle, by which the Horse is drawing upon his Back, greatly to his own Distress. To remove this Inconvenience, some have a Chain running as far back, under the Shaft from the Collar, as brings the Draft upon a direct Line. But this is liable to two capital Objections, particularly in the common Cars. Because in the Action of turning the Carriage, the Shaft from which the Beast draws, is a Lever to him, and by so much as he loses of its Length, in Proportion he is deprived of the Use of it, as a Lever. And every Man knows that the Ease of a Purchase, depends upon the Length of the Lever. The other Objection is, that when the Carriage inclines to fall backwards, which is too often the Case, the Horse cannot prevent it so effectually by his Draft's being so far back upon the Shafts, as he can when his Draft is, from the Points, upon the same Principles, that his Lever is considerably shorter, than when he draws from the Points of the Shafts. But in this Case, the Purchase is perpendicular; whereas in the former it is horizontal.

As to the Inconvenience, which attends the common Car Wheels not turning properly; in this I have totally removed it, by using Spook Wheels, which are to turn upon the Axis, independent of each other; but the Axis is not to turn, as in a common Car.

Another Reason for choosing Spook Wheels is, that they are by no Means so liable to collect Clay or Dirt in their Passage, as the Block Wheels to a common Car,

Wheels turn
independent
of each
other.

And why
Spook
Wheels are
chosen.

Further
Reason why
Spook
Wheels are
chosen.

The Description of the Uses of the

In common Practice, Wheels hung impro-
perly.

And why.

Car, and therefore less liable to the Obstructions caused thereby; unless when they are improperly hung, which I am sorry to observe is too prevailing in this Kingdom, and even in *England*, as may be explained to such Persons as shall wish to understand it; as may also, the Manner of clouting a wooden Arm, or making an Iron one to most Advantage, which as much as possible, is kept a Secret in the wheeling Busines; for there are many Men of that Trade who can make a good Wheel, and yet know not how to bush and hang it. Upon which *totally* depends the easy Draft of a Carriage.

Best Manner of bushing a Wheel.

To bush a Wheel in the best Manner, and most expeditiously should be done with an Engine, calculated for that Purpose only.

Block Wheels cannot be effectually bushed.

Block Wheels cannot be bushed properly, as Experience has often proved; for there are Gentlemen of Ingenuity in this Kingdom, who have seen the great Inconvenience attendant on the Operation of the common Car, and have attempted to remove it, by putting Boxes in Block Wheels, in order that they might turn independent of each other, upon Iron Arms; but it has been found, that great Difficulty attended the fixing the Boxes, because, if put really into the Plank, they cannot be wedged, it being impossible to drive the Wedges across the Grain of the Plank. To remove that Difficulty, a Piece of Timber has been lodged in the Centre of the Wheel, placing the Grain of the Block horizontally, and thereby the Boxes could be firmly fixed in that Piece: But the Remedy was almost as bad as the Disease; for the Block, or Piece of Timber, which is so lodged in the Centre of the Wheel, soon became loose by Labour and Contraption, and consequently that Part of the Carriage must fall into a crazy Fabrick; abstracted from Labour being increased to the Horse, as soon as the Wheels, in their revolutions, form that offensive Sight, zigzag Lines, which is the unavoidable Consequence of being out of Square, be the Wheels what Kind they may.

In

In the Article of putting on the Tire, I flatter myself Manner of some Amendment is also made, and which I now pur- putting on sue in all the Carriages made in my Factory. Tire im- proved.

In the common Manner of putting Tire on Wheels, the Nails are apt to start, and the Heads break off, by either of which Accidents the Tire gets loose, and the Wheel is suddenly racked or shaken. To prevent this, I put every Stake on with Screw-bolts, which draws up the Tire, and keeps it to its Place, from which it never can start, till the Tire be worn out.

The Manner of making the Heads of the Bolts, and Roads how punching the Tire, I apprehend, would be a great to be pre- served by the Preservation of our Roads, were it in general Use. Manner of And therefore seems to merit the Attention of the Le- making gislator; for by the general Manner of making the Tire-Nails. Nails for Tire, the Law for the Establishment of broad Wheels is defeated.

To prevent any Dirt or Grit getting in between the Boxes and Arms of the Carriage, Sand-pans are put upon the Ends of the Stocks, and Cuttoos over them, which will appear upon View, and which are put upon all the Carriages made in my Factory. The Iron Brackets which are mentioned, as being added to this Carriage, N^o. 50, in the following List, are disposed in such Manner, as to fortify the Parts most liable to fail in a Car; the Shafts or Sides are plated with Iron from the Axis to the Tug-pin Holes, and in every Part firmly affixed with Screw-bolts, which renders this Carriage a Machine of almost irresistible Strength and Permanence.

I might have been much fuller in my Description of this Car, but the Demand I have had for them is a stronger Proof, than any other I can give, of their superior Convenience, in every Kind of Businels, in which a Car can be used; and therefore I shall only add, that one Horse has drawn, at one Load, upwards of 26 Hundred Weight upon one of them on a very rough Road; and I am well persuaded, that the same Horse can draw upwards of 30 Hundred on the same Car-

The Description of the Uses of the

Carriage without any great Distress ; and what seems to be a pretty strong Fact, is, that since I introduced these Cars, my People will not use the old ones, and therefore, I have been obliged to part with all the common Ones I had.

And it is allowed by competent Judges, that they are compleatly calculated not only for the Use of the Farmer, but for Sumpter Carriages on Circuits, military Baggage, Linen Cloth, Carriers, Millers, Timber, and Luggage of all Kinds ; because severe Trials in the Use of them have shewn, that a Horse travels with Pleasure under a Load from 12 to 20 Hundred Weight upon one of them, when, on the same Journey, an Horse, under a common Car, with 6 and 7 Hundred upon him, has been suffering exceedingly by his distressing Draft, of which we have had many Instances, and very remarkable ones in bad Roads.

It must be confessed, that the Price is higher in the first Purchase than a common Car ; but yet, when it is considered that this will last much longer, and that the same Horse which draws 5 Hundred on a common Car, will, with more Ease, draw 12 Hundred on this, Candour must admit it to be a much cheaper Carriage, for all the Purposes of Business and Profit. And all Men will allow, that no *perfect* Machine can be had at the Price of an *imperfect* one.

For the Convenience of such Persons as use Turf in their Houses, I have lately put a Cradle to this Carriage, to be put on and taken off occasionally, (see N^o. 57) by which it is said, by those who are acquainted with Turf, that as much may be drawn at one Load, as at three or four, in the common Manner.

N^o 58 to 87, both inclusive, contain a List of various Articles, which, from their Names, shew their Uses, altho' some of them are new ; those which are improved in their Construction will shew for themselves.

Nº. 88. Is an House and Boxes, calculated for the Preservation of Bees, by which large Quantities of Honey and Wax, it is said, may be taken, without murdering those laborious Insects. I have, in some of my former Papers, professed not to understand the Treatment of Bees; but from an Attention which the DUBLIN SOCIETY have lately given to their Preservation, I was animated into an Application towards the Management of them, and have received great Information in reading Mr. Moses Rusden's Treatise upon that Subject, and from whose Book I have built one of these Houses, &c. described, Nº. 88. The Pleasure I have received, in seeing their Industry and Mechanism, which this Manner of keeping them admits of, I have conceived to be a full Recompence for the Expence of building their little Habitation, and the Success which the Method promises, induced me to give it a Place in my List. The Edition which I have of Mr. Rusden's further Discovery of Bees was printed in the Year 1679; whether it has gone through many Editions I know not, but I fear it is now out of Print, which being, I think such Gentlemen as are reputed Judges of this Management of Bees, would do the Public a Service to recommend the re-printing this Book.

Nº. 89. Is a neat and convenient Kind of Crib, for the more commodiously foddering black Cattle without Waste of their Fodder, calculated more as a Pattern for Gentlemen and Farmers to build them by, than with any Expectation of selling them, they being too large to be carried to any great Distance, but may very conveniently be removed from Place to Place about a Farm.

Nº. 90. Is a Machine, calculated for the slicing Turneps for black Cattle with Expedition. An Instrument which I was induced to bend my Attention to the Construction of, from observing that the Society of Arts in London had offered a Premium for the Construction of such a Machine. In that which I have made for the Purpose, it is conceived by competent Judges, that I have not been unsuccessful, because the

A L I S T of the

the Machine is fortified by great Strength, at the same Time that it has powerful Execution. The Simplicity of its Construction will render it intelligible to any Man, immediately upon a View of it. The Reasons why it is prudent to slice Turnips for black Cattle, will be found in my Report for the Year 1764.

I continue to give this Instrument a Place in my List, but from the Method which I have lately pursued, in feeding my Cattle with Turneps in the Winter, I have, in a Manner, rendered this Machine rather unnecessary, of which I shall furnish the Publick with Information in my next Report, for the Year 1768.

Nº 91 and 92, are sufficiently described in their respective Places.

A L I S T of the INSTRUMENTS.

Nº. 1. **T**HE DRILL PLOUGH, upon an improved Construction, with Brass Boxes, and compleatly mounted with Swingle-trees, Straps, Turnip-box, and Standards; and for sowing Wheat, Barley, Bere, Oats, Peas, Beans, Turnips, Sainfoin, Burnet, Buck-wheat, &c. 8 Guineas. See p. 9.

Nº. 2. The DRILL HARROWS, of a new Construction, riveted and mounted with fifty-four Harrow-pins, hung to a Carriage with Chains, Hooks, Keys and screw-bolted Staples. The Carriage mounted with Iron-arms, affixed with Screw-bolts and screwed Staples, Spoke-wheels bound with Iron, a Pair of Shafts, double-twisted Back-band, Staples and Hook, Tug-pins and Chains. 5 Guineas. See p. 9.

Nº. 3. The HOE PLOUGH, compleatly mounted with double Bands, four Iron Wedges, Coulter, Bolts, Keys and Hook, Rider and Screw-bolt, the Mold-board

board, Land-side and Bottom, plated with Iron, Cross and Beam united by a thorough Screw-pin, a steeled Coulter and Iron Share. 40 Shillings. See p. 9.

N^o. 4. The SINGLE CULTIVATOR, mounted in the same Manner, only that this Instrument has no Mold-board, but is made with a Chip which is plated with Iron. 1*l.* 14*s.* 1*½*. See p. 9.

N^o. 5. The DOUBLE CULTIVATOR, mounted in the same Manner, but instead of a Share with one Fin, this has two, made of wrought Iron and steeled. 40 Shillings. See p. 9.

N. B. The Instruments, N^o. 3, 4, and 5, are for Horse-hoing Drilled Crops, and to work them requires a Single Swingle Tree, and Swivel Chain, and therefore I shall enter it here as N^o. 6. Where any Person shall chuse to have one for each of them, they will please to order them.

N^o. 6. The SINGLE SWINGLE-TREE and SWIVEL CHAIN. 5*s.* 5*d.* This Swingle-tree will answer for any other Plough, which is to be drawn by Cattle lengthways, and which is always to be the Manner in Horse-hoing Drilled Crops.

In my former List I named the Marking Plough, and Double Mold-board Hoe Plough, but I there mentioned them as not being absolutely necessary to the Drill Culture, and in the Continuation of my Practice I am confirmed in that Opinion, and therefore I shall not give them a Place in this List, the above Instruments being all that are necessary for the compleat Execution of the Drill Husbandry, except the Harnesses, and two Muzzles, which I describe altogether, under the Article N^o. 7, for the Convenience of such Persons as have them not, or who cannot conveniently get them.

A LIST of the

N^o. 7. The HARNESS for the Drill Husbandry, described under one Head, with the Prices of each Article. When Gentlemen order them, they will please to distinguish, whether they would have those under the Column A, B, or C, by naming the Letter, there being a Difference in the Price, and consequently in the Quality.

N^o. 8.

	A.	B.	C.
	No. l. s. d.	No. l. s. d.	No. l. s. d.
Three Bridles, — — —	107 at 0 11 4½	108 at 0 8 0	109 at 0 6 0
Three Neck Collars, — — —	115 0 11 4½	116 0 7 6	120 0 4 6
One Cart Saddle and Crupper,	133 0 17 4	134 0 11 4½	135 0 7 6
Two Back Bands and Pads, — — —	148 0 8 8	— 0 8 8	149 0 6 6
Two Belly-Bands, — — —	143 0 3 3	— 0 2 2	— 0 2 2
Two Back Cruppers and Hip Straps, — — —	156 0 7 7	— 0 7 7	— 0 0 0
Two Muzzles, — — —	167 0 4 4	— 0 4 4	— 0 4 4
Two Pair of Trace Pipes, — — —	157 0 5 5	158 0 3 6	159 0 2 8½
Three Hame Straps, — — —	165 0 0 4	— 0 0 4	— 0 0 4
Two Pair of Collar Hames, — — —	99 0 6 6	— 0 6 6	— 0 6 6
One Pair of Draft Hames, — — —	99 0 8 1½	— 0 8 1½	— 0 8 1½
Two Pair of Long Traces, — — —	97 0 11 4½	— 0 11 4½	— 0 11 4½
One Stretcher, — — —	96 0 2 2	— 0 2 2	— 0 2 2

No. 8. The DRILL PLOUGH of a new Construction, for sowing Drilled Crops in the Flat Way at equal distant Rows. 6 Guineas.

N. B. I would not be understood to recommend this Instrument, because I conceive but an indifferent Opinion of the Husbandry. But as others may form another Opinion, I give a Place to the Instrument in my List. See p. 9. No. 8.

No. 9. The BLOCK PLOUGH improved, for four Cattle to draw double, compleatly mounted with Beam-plates and Screw-bolts, Mold-board, Side and Bottom plated with Iron; the Beam and Cross united by a thorough Screw-pin, double Bands and Iron Wedges, Rider and Screw-bolt, a screw Staple, Hook and Washes, Collar, Bolts, Keys and Hook; a strong steeled Coulter and an Iron Share of a new Pattern. 2*l.* 10*s.* For its Use, see p. 9. No. 9.

No. 10. The CHIP PLOUGH, mounted in the same Manner. 2*l.* 10*s.* See p. 10. No. 9.

No. 11. The HUNTING PLOUGH, with an Iron Chip, the Cattle to draw single, mounted in the same Manner. 2*l.* 10*s.* See p. 10. No. 11.

No. 12. The BAITING PLOUGH, mounted in the same Manner, with a wrought Iron steeled Share. 2 Guineas and an half. See p. 10. No. 12.

No. 13. The ESSEX PLOUGH, *i. e.* a Plough to work with two Cattle, both a-breast, and the Plough-man to drive, mounted in the same Manner. 2 Guineas. See p. 10. No. 13.

No. 14. The LOMAX PLOUGH, for four Cattle to draw double, mounted in the same Manner. 2*l.* 10*s.* See p. 11. No. 14.

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No. 15. The LOMAX PLOUGH, for two Cattle to draw single, mounted in the same Manner. 2 Guineas. This is what I call my Seeding Plough. See p. 11. No. 15.

N. B. The Swingle Tree, No. 6, is necessary to work this Plough.

No. 16. The GARDEN PLOUGH, mounted in the same Manner as No. 3. 1*l.* 14*s.* 1*½*. This is a Plough of the same Make, calculated for one Horse. See p. 12. No. 16.

N. B. No. 6, is necessary to work this Plough.

No. 17. A large strong Plough, mounted in the same Manner as No. 9. and of the same Make, calculated for ploughing from twelve to eighteen Inches deep, and to be drawn by any Number of Cattle from eight to sixteen. 3 Guineas. See p. 12. No. 17.

No. 18. The TURN-WRIST, or Kentish Plough with or without Wheels. See p. 12. No. 18. The latter 3 Guineas.

No. 19. Mr. TULL's Four Counter'd Plough. See p. 13. No. 19.

No. 20. The HERTFORD-SHIRE, or double Wheel Plough. See p. 13. No. 20.

No. 21. The OXFORD-SHIRE, or single Wheel Plough. See p. 13. No. 20.

No. 22. SLEDGES for four-horse Ploughs, shod with Iron. 10*s.* See p. 13. No. 22.

No. 23. SLEDGES for two-horse Ploughs, shod with Iron. 7*s.* See p. 13. No. 22.

No. 24.

No. 24. PLOUGH HAMMERS. 3*s.* 9*d.*

No. 25. PLOUGH PADDLES. 4*s.* 7*d.*

No. 26. The DRAIN PLOUGH, to mark out Drains of different Diameters, mounted with a Spoke-wheel, bound with Iron, Iron Axis, double Wheels behind, plated Sliders, Swivels, Staple, Bolt Key and Lip; twelve strong Plates bedded in the Beams, Body Screw-bolts, Brackets and Screw-bolts, thorough Screw-bolts to hind Axis, two strong steel'd Coulters and Iron Wedges, with Swingle-trees and Chain, mounted. 5 Guineas. See p. 14. No. 26.

No. 27. The SCARIFICATOR, with four Coulters, for taking Moss off Meadow Land, and otherwise improving it, mounted with a Spoke-wheel bound with Iron, double Wheels behind, two Iron Axletrees, double Iron Brackets, plated Sliders, swivel Staples, Swingle-tree Brogues and Loops, five steel'd Coulters, their Holes double plated and the Table screw bolted. 4 Guineas. See p. 14. No. 27.

No. 28. The SCARIFICATOR DRAIN PLOUGH, being a Scarifieator and Drain Plough comprised in the same Instrument, mounted with Body-bolts, Brackets and Screw-bolts, a Spoke-wheel bound with Iron, and an Iron Axis, two hind Wheels, thorough Screw Bolts and Brackets to the hind Axis, plated Sliders, swivel Staple, Bolt, Key and Lip; twenty-two strong Plates bedded in the Beams; two strong steel'd Coulters for marking out Drains, and seven steel'd Coulters for the Purpose of Scarifying Meadow Land; Wedges, Swingle-trees, Swivel Chain, Brogues, Loops, &c. 6 Guineas. See p. 14. No. 28.

No. 29. The DITCHING PLOUGH. This Instrument is mounted in the same Manner as No. 4, with the Addition of Beam-plates, and is an Instrument of the same Kind, only that it is much stronger. 40*s.* See p. 14. No. 29.

N. B. This Instrument is to be worked with the Horses one before the other, and therefore requires a single Swingle-tree, No. 6, and which is to be ordered, if required with it.

No. 30. SWINGLE-TREES which are for drawing double, and a Swivel Chain, Brogues, Loops and Rivets. 12s. and without a Chain, 9s. a Set.

No. 31. A LARGE HARROW upon Wheels, a new Instrument. See p. 14. No. 31.

No. 32. HARROWS for two, and four Horses, with Chains, and affixed to a Carriage, with a Pair of Wheels and Shafts. See p. 14. No. 31.

No. 33. The TRIANGULAR PLOUGH-HARROW, for the reducing Ground; strong Bulls, Iron-slats affixed with Screw-bolts, Anchor-pins, steeled, nutted and screwed; Collar-bolts, Keys and Hook. 5 Guineas. See p. 14. No. 31.

No. 34. DOUBLE HARROWS for four Horses, eight Bulls mounted with square Pins, coupling Screw-bolts and Nuts, screwed Staple and Hook. 3 Guineas. See p. 14. No. 31.

N. B. I have lately riveted the Bulls of some of these Harrows, on each Side of every Pin Hole, which prevents their being split, in driving the Pins by a careless Hand. That additional Work, adds to the Price 8s. 4d. and therefore, Gentlemen who order them, will please to specify whether they would have them riveted or not.

No. 35. DOUBLE HARROWS for two Horses, mounted in the same Manner. 3l. See p. 14. No. 31.

N. B. When riveted, that adds to the Price, 6s. 8d.

No.

No. 36. The SLEDGE for the four-horse Harrows, shod with Iron, Chains, Hooks, suspending Hooks and Staples, and Iron Lid to the Box for the coupling Pins of the Harrows and Keys. 16s. 3d. See p. 13. No. 22.

No. 37. The SLEDGE for the two-horse Harrows, mounted in the same Manner. 14s. See p. 13. No. 22.

No. 38. The TRIANGULAR PLOUGH HARROW, for one or two Horses, chiefly for Peas.

No. 39. GARDEN HAND HARROWS.

No. 40. FLAX HARROWS.

No. 41. SLEDGES and TRUCKLES of every Construction, for Ploughs, Harrows, Bushes, Timber, Sacks of Corn, Lead, &c. See p. 13. No. 22, &c.

No. 42. WAGGONS with either broad or narrow Wheels, finished in the compleatest Manner. See p. 15. No. 42.

No. 43. CARTS with three Wheels three Inches broad, for one or two Horses; with a framed Bottom, Compacts Shaft Slats and Screw Bolts, and compleatly mounted with strong Stock-bands, Sand-pans, Buttons and Pins, Cuttoos affixed with Screw-bolts, strong counter-sunk Hinges and Screw-bolts, and strong Shaft-straps; strong Iron Standards, screwed and nutted; Iron Tail-pins and Chains; Iron Tail-board Lips and Bolts; Tuck-pins, Chains and Staples, double-twisted swivel Back-band, Staples and Hook; a strong Iron-sword, Screw-bolt and Staple; strong Hurters, Iron Trap-bolt, Staples and Screw-shaft Staples, strong and full sized Tire on the Wheels, countersunk and put on with Screw-bolts; Fore-carriage mounted with strong treble Iron-bows, Screw-bolts, Centre-pin and Keys, Gudgeons, Gudgeon-hurters and Gudgeon-brackets, affixed with Screw-bolts and strong Shaft-bolt, &c. 11 Guineas. See p. 15. No. 42.

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No. 44. The same CARRIAGE, mounted with Iron Arms, affixed with Screw-bolts and Screw-staples. 12 Guineas. See p. 15. No. 42.

No. 45. The same CARRIAGE, with six-Inch Wheel, Wooden Axle-tree. 13 Guineas. With Iron Arms, 14 Guineas. See p. 15. No. 42.

No. 46. The same CARRIAGE with nine-inch Wheels, Wooden Axle-tree. 15 Guineas. With Iron Arms, 16 Guineas.

N. B. Where the Tire for these Wheels shall be chosen of thin Iron for Lawns, the Price will be less in Proportion to the Quantity of Iron abated. See p. 15. No. 42.

No. 47. Two-HORSE CARTS, with a framed Bottom, Compass Shaft-flats and Screw-bolts, and compleatly mounted with strong Stock-bands, Sand-pans, Buttons and Pins; Cuttoes affixed with Screw-bolts, strong Hurlers, strong counter-sunk Hinges and Screw-bolts; strong Shaft-straps, strong Iron Standards, nutted and screwed; Iron Tail-pins and Chains; Iron Tail-board Lips and Bolts; Tug-pins, Chains and Staples; double-twisted twivled Back-bands, Staples and Hook; a strong Iron-sword Screw-bolt and Staple; Iron Trap-bolt, Staples and Screw-shaft Staples; strong and full sized Tire on the Wheels, countersunk and put on with Screw-bolts, &c. 12 Guineas. And mounted with Iron Arms, 13 Guineas. See p. 15. No. 42.

No. 48. ONE-HORSE CARTS, mounted in the same Manner as No. 47. with Wooden Axle-trees, 7 Guineas. With Iron Arms, 8 Guineas. See p. 15. No. 42.

No. 49. The FARMER'S CART for one Horse, mounted in the same Manner as No. 47, and with Iron Arms, and the Addition of Top-railing, calculated for drawing

drawing Hay, Straw, Corn in Sheaf or Sacks of Corn, Dung, Earth, &c. 7 Guineas. See p. 15. No. 42.

No. 50. A TURF CRADLE, for drawing Turf, or Grass, fitted to this Cart, No. 49; to be put on and taken off occasionally. One Guinea.

No. 51. BOMB CARTS of any Size.

No. 52. SMALL CARTS, of a new Construction, for Lawns or Gras Walks, which will not cut the Sod.

No. 53. WATER-CARTS of any Construction, either to fill themselves, or to be filled by Hand or Pump.

No. 54. LOW-BACKED CARS of a new Construction, mounted with Spoke Wheels, and bound with Counter-sunk Tire put on with Screw-bolts, Iron Arms put on with Screw-bolts, Wing-brackets and Screw-bolts, Tug-pins and Chains, double-twisted swiveled Back-band, Hook and Staples, 5 Guineas. When a double Centre Bracket, moulded Brackets behind, Shaft Brackets, and Shaft Lining, all firmly affixed with Screw-bolts, a Drag-staff hung on a Swivel, Screw-Staple and suspending Chain, Cuttoos, Sand-Pans, Buttons and Pins, Tug-Pins and Chains are added, then the Price is 6 Guineas. See p. 16 to 22.
No. 54

No. 55. LOW-BACKED CARS, of a second Kind, mounted with Spoke Wheels and Iron Arms. 4 Guineas and an half.

N. B. This Cart moves upon the same Principles, and works as easy as the above, No. 54, but is not so fortified with Iron and Screw-bolts, being calculated for Persons who cannot afford to pay for the Best. A Turf Cradle may be fitted to this also.

No. 56. SIDE-BOARDS, HEAD-BOARD, TAIL-BOARD, fitted to either of the above Cars, and mounted, with coupling Irons, Iron Brackets and Screws, with

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with Iron Tail-pins, Chains and Staples, for drawing Dung, &c. 16*s.* 3*d.*

No. 57. A TURF CRADLE, for drawing Turf, suited to either of the Cars, to be put on and taken off occasionally, one Guinea. See p. 22.

No. 58. COACH, POST-CHAISE, CABRIOLE, and other WHEELS.

No. 59. SPOAKED WHEEL BARROWS of a neat and strong Kind. Half a Guinea a Piece.

No. 60. WHEEL BARROWS, for Gardens, with Broad-Rollers, for the Preservation of the Walks. 16*s.* 3*d.*

No. 61. WATER-BARROWS, for Gardens, with a Pair of Wheels of a new and compleat Kind. 3 Gu.

No. 62. LARGE WHEEL BARROWS, for Stables or Gardens, with a Spok Wheel, and Iron Brackets. 17*s.* 4*d.*

No. 63. The same BARROW, with an Hollow Roller, shod with Iron, and Iron Brackets for Gardens. 20 Shillings.

No. 64. A STABLE BARROW, with a Pair of three Feet Spok Wheels, shod with Iron, an Iron Axle-tree, and in every Respect made like a Cart, except that of having Handles for a Man to wheel it, instead of Shafts for an Horse. 4 Guineas.

No. 65. WEED-BARROWS for Gardens. 13*s.*

No. 66. GRASS-BARROWS for Soiling Plough Cattle when standing yoaked in the Field. 13*s.*

No. 67. SHEEP-RACKS, of a compleat and new Construction, with Bevel Racks, running on Wheels, and Iron Arms. 3 Guineas.

No. 68.

No. 68. SHEEP-RACKS of a compleat and new Construction, with Perpendicular Racks, running on Wheels, and Iron Arms. 4 Guineas. Calculated to prevent Waste of Hay.

No. 69. FIELD-GATES of any Construction.

No. 70. GARDEN-SEATS, CHAIRS, and STOOLS, of various Kinds.

No. 71. ROLLERS for Corn and Meadow, of a compleat and new Construction.

No. 72. SPIKED-ROLLERS of any Construction.

No. 73. A ROLLER for reducing Fallows, be they ever so stubborn.

No. 74. FANNERS for Winnowing Corn in the Barn, when the Wind does not serve to Winnow out of Doors, or in the Passage of the Barn Doors. 3 Guineas and half.

No. 75. BRASS-WIRE-SIEVES for Corn and Seeds.

No. 76. HAY-RAKES, of a strong and neat Kind, 19s. 6d. per Dozen.

No. 77. IRON RAKES of various Kinds.

No. 78. HAY-FORKS, Handles, Ferrils, and Rivets neatly mounted, 2s. 8d $\frac{1}{2}$.

No. 79. HAY-PITCHING FORKS, with long Handles, Ferrils, Head, and Rivets, 3s. 9d $\frac{1}{2}$.

No. 80. THREE-PRONGED FORKS for Dung, compleatly mounted. 5s. 5d.

No. 81. THREE-PRONGED FORKS, for raising Stones or Rubbish out of Gardens. 5s. 5d.

No. 82.

A LIST of the

No. 82. DRAG-FORKS, for unloading Dung in small Heaps on Land. 3s. 3d.

No. 83. DOCK-IRONS, for pulling up the Roots. 7s. 6d.

No. 84. The BRIER-DOG, with polished Cheeks, screw-locked Arms, Block double-hooped, and double-banded Lever, for pulling up Thorns, &c. by the Roots. 1l. 14s. 1d $\frac{1}{2}$.

No. 85. The STUMPING-IRON, for compleatly taking the Beards off Barley with Expedition. 13s.

No. 86. ENGINES for cutting Hay and Straw for Horse-Meat.

No. 87. VENTILATORS for Hay-Ricks, by which the Hay may be saved without putting it in Tramp-Cocks.

No. 88. BEE-HOUSES and BOXES, for taking the Honey and Wax, without killing the Bees, consisting of an House, and six Octagon Boxes, for two Colonies. 7 Guineas. See p. 23. No. 88.

No. 89. CRIBS of a neat and new Construction for foddering Black Cattle. See p. 23. No. 89.

No. 90. The TURNEP SLICING ENGINE, a new Instrument for slicing Turneps for Black Cattle. See p. 23. No. 90.

No. 91. The STUBBLE HORSE-RAKER, calculated for pulling up and gathering Stubble at one Operation, where the Corn shall have been sown flat, either under the Harrow or Plough.

No. 92. The BROAD-CAST TURNEP HORSE-HOE, an Instrument for thinning and horse-hoeing Broad-cast Turneps.

No. 93.

No. 93. A Gentleman's WALKING POLE, six Feet long, with Brass Figures upon it, and Variety of neat and useful Tools, to put upon the Staff occasionally. 16s. 3d.

No. 94. BULLOCK HAMES, of a strong and neat Kind. 4s. 4d. a Pair.

No. 95. BILL HOOKS, home made, and well steeled and tempered. 2s. 2d.

No. 96. A STRETCHER for TRACES. 2s. 2d.

No. 97. TRACES of different Kinds, from 8s. 8d. to 11s. 4d. a Pair.

No. 98. LONG PLOUGH CHAINS, short Links, 9s. 9d. Short Plough Chains, 3s. 9d. $\frac{1}{2}$

No. 99. HORSE-HAMES, of strong compleat Kinds, for Ploughs and Carriages, from 6s. 6d. to 8s. 1d. $\frac{1}{2}$ a Pair.

No. 100. SUSPENDING-CHAINS for Ploughs, 3s. 6d. per Pair.

The LIST of LEATHER-HARNESS.

B R I D L E S, of various KINDS.

No. 101. The very best *English* front Bridles, with Face Piece, Nose Piece, and Star Piece, elegantly ornamented with Work, lettered and dated, and furnished with Fringe, Bobs, Tossels and a Pair of Bells, and two Pair of Reins. 1l. 15s. 6d.

No. 102. The same Bridle, compleat, without Bells. 1l. 8s.

No. 103. The same Bridle, compleat, without Bobs, Tossels, or Bells, 1l. 5s.

No. 104.

No. 104. The same Bridle plain, without ornamental Work, Bobs, Tossels, or Bells, only bound, lettered and dated. 17*s.* 4*d.*

No. 105. The same Bridle, quite plain, without any ornamental Work, Letters, Date, Bobs, Tossels, or Bells. 14*s.* 6*d.*

No. 106. The very best Winker Bridles, lettered and ornamented with Work, the Front handsomely lapped, with Stays and Buckles to the Winkers, Tossels and double Reins. 14*s.* 6*d.*

No. 107. The same Bridle without Tossels, and with double Reins. 11*s.* 4*d.* $\frac{1}{2}$

No. 108. The same Bridle, neatly bound with Red *Morocco Leather*, lettered, without Tossels, and with single Reins. 8*s.*

No. 109. Neat Winker Bridles, single Reins. 6*s.*

N. B. All the above Bridles, are mounted with strong home-made polished Bits, and made of the best tanned Cow Leather, Black, that they may be kept clean, like Coach Harness, unless people chose them Brown.

No. 110. Common White *Irijb* Winkers, from 14*d.* to 19*d.* $\frac{1}{2}$ a Pair.

NECK-COLLARS, for HORSES and BULLOCKS.

No. 111. The very best *Englifb* tanned Cow Leather Neck Collars, double welted and bound, lined with soft Leather or Swan Skin, to absorb Sweat, faced with curled Hair, and mounted with large Housing, and that compleatly fringed, lettered, and elegantly ornamented with Work. 1*l.* 5*s.*

No. 112.

No. 112. The same Collar, with Housing, neatly lettered and fringed. 16*s.* 3*d.*

No. 113. The same Collar, with Housing, neatly lettered, and bound with Red *Morocco* Leather. 13*s.*

No. 114. The same Collar, without Housing. 9*s.* 9*d.*

No. 115. Good *English* tanned Leather Collars, lined with Linen, double welted, faced with curled Hair and Wool, and handsome plain Housing, neatly bound. 11*s.* 4*d.* $\frac{1}{2}$

No. 116. The same Collar, without Housing. 7*s.* 6*d.*

No. 117. Plain *English* tanned Leather Collars, single welted, lined with Linen, faced with curled Hair and Wool, and with plain Housing. 8*s.* 8*d.*

No. 118. The same Collar, without Housing. 5*s.* 5*d.*

No. 119. Plain *English* Collars, made of White Leather, lined with White Linen, and faced with Wool. 5*s.* 5*d.*

N. B. These White Collars are chiefly for working in Mines, where the White Leather, from the Manner of its being manufactured, will last considerably longer than any tanned Leather, as Experience hath shewn in the Mines of *England*.

No. 120. The best hairy Collars, double welted, faced with curled Hair, lined with Linen, double bolstered, and made like *English* Collars. 4*s.* 6*d.*

No. 121. Best *Hijib* hairy Collars, lined with Ticken, faced with Hair and Wool, and covered with Side Pieces. 3*s.* 3*d.*

No. 122. The same Collar, lined with Ticken, and faced with Wool. 2*s.* 9*d.*

No. 123.

A L I S T of the

No. 123. The same, lined with Ticken, without Side Pieces, and stuffed with Straw. 2s. 2d.

No. 124. Best Collars for Plough Bullocks, made very large and full, double welted and double bolstered, faced with Hair and Wool. 7s. 6d.

No. 125. A cheaper Kind, at 5s. 5d.

N. B. I shall just observe here, for the Information of the Reader, that the Manner of making all these Collars, in the Part next the Throat of the Horse, for the greater Freedom of his Breathing, differs from the Manner practised in Ireland, in the Construction of Collars; which not being attended to, by the Collar-Makers here, (perhaps from the mischievous Kind of Work which they find the greatest Demand for) we thence, so frequently, hear a poor Animal, in an hard Draft, blowing as if his Wind is broke, from the Pressure of the Collar upon his Wind-pipe, although he be a sound Horse in that Respect. And I have had some of my Horses, which were good Cattle, sound, and in good Order, fall to the Ground under their Burthen, from this Circumstance. And Gentlemen cannot but have observed Carmen, (*more particularly when the Cattle have been their own*) frequently upon the Road, run in great Haste to stop their Horses, as soon as they hear them begin to blow, because they well know the Consequence, if the Horses are not stopped. And how pitiable a Case it is, that so valuable and generous a Creature, struggling in the Execution of his Office, even against the Pain of Strangling, by the Inaccuracy of constructing any Part of his Accoutrements, should be so near expiring, as to fall under his Burthen, Humanity will suggest.

The Housing to Collars, is not only ornamental, but useful; for it prevents the Rain running between the Collar and Shoulders of the Horse, where he is very apt to be injured, when the Housing is not used.

When

When Gentlemen order any Collars of me, they will please to let me know whether their Horses be large or small.

No. 126. Best Jockey Collars, faced with curled Hair, and lined with soft Leather, or Swan Skin. 6s. 6d.

No. 127. Common ditto. 5s. 5d.

No. 128. Best Chaise Collars. 6s. 6d.

No. 129. Common ditto. 5s. 5d.

CART-SADDLES, or STRADDLES.

No. 130. The very best *English* Cart Saddles, the Tree compleatly plated with Iron, and furnished with double Housings; those put on with Brafs Nails, and elegantly lettered and ornamented with Work, the Pannel of tanned Leather, and lined with Hair; a broad Crupper neatly worked, and double-tongued Buckle; a worked Leather Pad to the Crupper, a Girth, and an Iron Spring on the Tree, to prevent the Back-band of the Carriage flying out, and a Swan Skin Saddle Cloth bound. 2l. 2s.

No. 131. The same Cart Saddle, with *Roman* Letters and Date on the Housings, and those bound with Red *Morocco* Leather, but no Saddle Cloth. 1l. 14s. 1d. $\frac{1}{2}$

No. 132. Good plain *English* Cart Saddle, with plain Housings, without Iron Plates or Spring, faced with curled Hair, and a broad Crupper and Pad. 1l. 2s. 9d.

No. 133. Good plain *English* Cart Saddles, with a broad Crupper and Pad, lined with Swan Skin, and faced with curled Hair, neatly finished. 17s. 4d.

A L I S T of the

No. 134. Good plain *English* Cart Saddles, neatly finished, and narrow Crupper. 11s. 4d. $\frac{1}{2}$

No. 135. Plain *English* Cart Saddles, without Cruppers. 7s. 6d.

No. 136. Best *Irish* Cart Saddles, faced with Stuffing, and the best jointed Trees. 4s. 6d.

No. 137. Another Kind of ditto. 3s. 9d. $\frac{1}{2}$

No. 138. The Common ditto. 2s. 8d. $\frac{1}{2}$

No. 139. Block Cart Saddles, of all Kinds.

N.B. Here I shall observe, that Care is taken in the Stuffing these Cart Saddles, that the Pannel rises before and hind, so as not to press-upon and wound the Horse, as is generally the Case with those I have bought here, from the Pannel not being properly cut or stuffed.

B E L L Y - B A N D S .

No. 140. Best *English* Belly-bands, with double tongued Buckles, neatly worked and ornamented, for the Shafts of Carts or Cars, to prevent the Carriage rising in ascending an Hill, or when the Load has been injudiciously put on too far behind. 7s. 7d.

No. 141. Plain Belly-bands for the same Purpose, with double Buckles. 5s. 5d.

No. 142. The same, for large Carriages, lined with Leather and worked. 11s. 4d. $\frac{1}{2}$

No. 143. Plain Belly-bands for Horses or Bullocks in Ploughs, or leading Horses in Waggons or Carts, from 2s. 2d. to 3s. 3d.

No. 144.

No. 144. Linked Belly-bands, double capped, and lined up, for Waggons or Carts. 4s.

B R I T C H E N S.

No. 145. Best *English* Britchens, double Hip Straps, compleatly finished, and elegantly ornamented with Work. To prevent a Carriage running upon an Horse or Horses, which are in it, in descending an Hill, or to enable the Horse in the Shafts to back the Carriage. 14s. 6d.

No. 146. The same Britchen, neatly finished, but not ornamented with Work. 12s.

No. 147. Best *Irish* Britchens, neatly made. 8s. 6d.

B A C K - B A N D S.

No. 148. Broad Back-bands, with double-tongued Buckles and Leather Pads, neatly worked and stuffed, for Ploughs. 8s. 8d.

No. 149. Broad Back-bands, with double Buckles and common Pads, for Ploughs. 6s. 6d.

No. 150. Narrower Back-bands, with single Buckles, and without Pads, for Ploughs. 4s. 6d.

No. 151. Broad Noose Back-bands, with worked Pads and Tossils, and handsomely ornamented, for the leading Horse or Horses, in Waggons or Carts. 9s. 9d.

No. 152. The same Back-bands, plain, with common Pads. 6s. 6d.

No. 153. The same Back-band, with double Iron Links instead of Nooses, with worked Pads and Tossils. 9s. 9d.

A L I S T of the

No. 154. The same Back-band, with single Iron Links, and common Pads. 6s. 6d.

B A C K - C R U P P E R S.

No. 155. Back Crappers and Hip Straps, for the leading Horses in Waggons or Carts, handsomely worked, ornamented and fringed. 9s. 9d.

No. 156. The same plain, for Ploughs, Waggons, or Carts. 7s. 7d.

T R A C E P I P E S.

No. 157. Best tanned Leather Trace Pipes, for Waggons, Carts, or Ploughs. 5s. 5d. a Pair.

No. 158. Common ditto, neatly closed. 3s. 6d. a Pair.

No. 159. Common ditto, *Irish.* 2s. 8d.^½ a Pair.

English W H A L E - B O N E W H I P S, &c.

No. 160. Best *English* Waggon Whalebone Whips, 9 Feet long. 9s. 9d,

No. 161. The same, for two or three Horse Carts, 7 Feet long. 7s. 7d.

No. 162. The same for driving Ploughs, 6^½ Feet long. 6s. 6d.

No. 163. The same for a one Horse Carriage, 5 Feet long. 5s. 5d.

No. 164. An Elastick Whalebone Bullock Goad. 6s. 6d. I have been induced to think of this Article, from the Pain I have felt, at frequently seeing the Drivers

Drivers of Ploughs, unmercifully stabbing the Bullocks with a Nail, (commonly called a Prod) put into the End of a stubborn Stick, often to the great Pain of the Animal and Injury of its Owner: Circumstances, which cannot happen in the Use of this Goad.

SUNDRY ARTICLES.

No. 165. Straps for Hames, with a Buckle. 4d.

No. 166. Horse Nettis, for Ploughs, Waggons, or Carts.

No. 167. Muzzles, made of the best tanned Leather, for Stallions, or Horse-hoeing drilled Crops. 4s. 4d.

No. 168. Dutch Head Collars or Halters, for Stables, with double Leather Reins. The best Kind. 6s. 6d.

No. 169. The same, such as are generally made, 5s. 5d.

No. 170. The same, with two Iron-linked Reins,

No. 171. The same, with single-linked Reins. 6s.

No. 172. The same, with a single Leather Rein. 4s.

No. 173. Common Head Collars, with single Reins. 2s. 8d. $\frac{1}{2}$

No. 174. White Jocky Collars, from 13d. to 16d.

No. 175. Best English Hedging Mittens, welted. 3s. 3d. For defending the Workman's Hand, in splashing or cutting Hedges, Faggots, or Furz.

No. 176. Common ditto. 2s. 2d.

No. 177. Millers and other Pads, in the English Form, for carrying Sacks on an Horse's Back.

A L I S T of the

No. 178. *Englifb* Hamper Pads, for carrying Hamps on an Horse's Back, with Straps and Bolsters.

No. 179. Hood Winks, for Horses in Mills or Paf-tures, from 2*s.* 2*d.* to 2*s.* 8*d.* $\frac{1}{2}$ a Pair.

No. 180. Bullock Suggons, of Bull-rush and Gadded, from 1*4d.* to 1*6d.*

No. 181. Nossils and Tuggs, for a Shaft Horse to draw by, instead of Iron Chains and Rings, which I find injure the Shafts greatly, often the Collars, and sometimes the Horse. These are made of the best tanned Cow Leather, lined, handsomely worked, and with double tongued Buckles. 8*s.* 8*d.* a Pair.

No. 182. The same, made with white or hairy Leather, quite plain, and no Buckles. 5*s.*

No. 183. Black Leather Caps of different Kinds, for Ploughmen, Plough-drivers, Carmen, Waggoners, Post-Chaise Boys, or Laborers.

No. 184. Black Velvet Caps, for Gentlemen or Farmers, of any Kind.

No. 185. Saddles and Bridles, made in the *Englifb* Manner, of various Kinds.

No. 186. Side Saddles of all Kinds.

No. 187. *Englifb* Pads of all Kinds, for Women.

No. 188. Pillions of all Kinds, and Pillion Cloaths.

No. 189. Mail Pillions.

No. 190. Leather Bags and Portmanteaus.

No. 191. Watering Bridles, for Coach-Horses.

No. 192. Coupling Reins, from 1*9d.* $\frac{1}{2}$ to 2*s.* 2*d.*

The

The last Number having finished my List, I shall now, for the Convenience, and readier Information of Gentlemen, who may wish to supply themselves with compleat Sets of Instruments for *Tillage*, endeavour to state distinct Tables, of Sets of Ploughs, and their necessary Appurtenances; with Sets of Harnesses, and their Appurtenances: And as the latter differs in Price, so I shall give distinct Tables thereof, referring by the respective Numbers, to the Articles in the List at large, as I have done in the Harness for the Drill Husbandry, in p. 26. No. 7. And all these distinct Sets I shall distinguish under the Letters of our Alphabet, beginning with the Letter A. So that when any Person means to have a compleat Set or Sets of any of the following Articles, he will please to name the *Letter*, under which the Column stands, and the Number of Sets he would have, of the Article or Articles that he may want; and I shall, thereby, instantly know the Kind he would have, in Point of Quality. And this Method will be essentially necessary to be observed, in the ordering Harness for any particular Purpose.

A Set

A LIST of the

A Set of Ploughs, for four Horses or Bullocks, for making Fallow, and for sowing Corn, either in small Ridges, or in Broad Sets under the Plough, with their necessary Appendages, *viz.*

	A.	B.	C.	D.
No.	l. s. d.	l. s. d.	l. s. d.	l. s. d.
9 at 2	10 0	2 10 0	2 10 0	2 10 0
15	2 5 6	2 5 6	2 5 6	2 5 6
The Block Plough	—	—	—	—
The Lomax, or Seeding Plough, to draw single, wider in the Sole than the following,	—	—	—	—
The same Plough in the Sole than the above, and why. See Page 11 and 28. No. 15.	15	2 5 6	2 5 6	2 5 6
The Sledge for the Block Plough,	22	0 10 0	0 10 0	—
Two Sledges for the Seeding Ploughs,	23	0 7 0	0 7 0	—
Two Plough Hammers, —	24	0 3 9½	—	0 3 9½
Two Plough Paddles, —	25	0 1 7½	—	0 1 7½

The Reader, it is presumed, will immediately see, that if he would have all the Articles, he is to order the Column A. If no Hammers or Paddles, the Column B. If no Sledges, the Column C. And if neither Sledges, Hammers, or Paddles, the Column D.

A Set

A Set of Harrows, for four Horses, or Bullocks; for the Purposes of reducing Ground, and sowing Corn under the Harrow, with their necessary Appurtenances, *viz.*

	A.	B.	C.
No.	l. s. d.	l. s. d.	l. s. d.
One Pair of four Horse Harrows,	34 at 3 16 7	at 3 8 3	at 3 8 3
Two Pair of two Horse Harrows,	35 3 6 8	3 0 0	3 0 0
A Sledge for No. 34.	36 0 16 3	0 16 3	0 0 0
Two Sledges for No. 35.	37 0 14 0	0 14 0	0 0 0
One Set of Swingle-trees, with a short Chain,	30 0 12 0	0 12 0	0 12 0

The Reader will observe, that in the Column A, the Harrows are to be riveted B, not riveted, both the Sets having the proper Sledges, but in the Column C, the Harrows will not be riveted, neither are the Sledges included in that Column. The Swingle Tree, No. 30, are necessary to the working the second two Horse Harrow.

A Table

A TABLE, containing compleat Harnesses for four Horses, of different Qualities, in four distinct Columns, referring by the Numbers, to the respective Articles in the preceding List.

50

A LIST of the

Names of the ARTICLES.	A.	B.	C.	D.
No.	s. at 11 107	s. at 8 108	No. 108 at 8 0	No. 109 at 8 0
Four Bridles,	—	4 $\frac{1}{2}$	4 $\frac{1}{2}$	6 0
A Pair of Coupling Reins,	—	2	2	— —
Four Neck Collars,	—	11	11	— —
Four Hame Straps,	—	0	4	3 3
Four Back-bands,	—	8	8	0 4
Four Belly-bands,	—	8	8	4 6
Four Back Crappers and Hip Strap,	—	3	3	— —
Four Pair of Trace Pipes,	—	7	7	2 2
Four Pair of Collar Hames,	—	5	5	— —
Four Pair of Traces,	—	11	4 $\frac{1}{2}$	143 2 4 2
One Long Plough Chain,	—	98	9	150 7 7
One Pair of suspending Chains,	—	100	3	158 3 6
One Set of Swing-trees, and a short Plough-Chain,	—	12	0	159 6 2 8 $\frac{1}{2}$
One Set ditto, without a Chain,	30	9	30	— —
One Whale-horse Whip,	162	6	6	— —

N. B. Thus, four Horses are furnished with compleat Tackling, by which they cannot be cut or hurt; for working the four Horse Plough, No. 9. The four Horse Harrows, No. 33. The two Seeding Ploughs, No. 15, and the two Horse Harrows, No. 34. Only with this Difference, that when the compleat Set of Ploughs, A, are ordered, with any one of these Columns of Harnesses, A, B, C, or D, that two Pair of the Traces will be made longer than would be necessary for working four Cattle to the Plough No. 9, only, and these two longer Pair of Traces are for the leading Horses, in working the Ploughs, No. 15. The same Rule will be observed in the Harnesses for four Ballocks, (which follow in the next Tables,) when the Set of Ploughs, A, shall be ordered with Harnesses. But when only a four Horse Plough and Harnesses shall be ordered, then the Traces will be all of a Length.

A TABLE,

A in a C stinct Columns, re-
the respeC

E. K. L.

No.	l.	s.	d.	No.	l.	s.	d.
105	o 14	o	8 o	109	o	6 o	
112	o 16	o	4 6	121	o	3 3	
131	1 14	o	7 6	136	o	4 6	
141	o 5		—	—		—	
146	o 12	o	8 1½	99	o	8 1½	
99	o 6		—	—		—	
181	o 8	o	o 4	165	o	o 4	
165	o o		—	—		—	
163	o 5		—	—		—	
—				—		—	

of Gentle Horse, in a one Horse
C to their Q mn, referring by the
N naming ea nting, for compleatly
fu vey comm it unnecessary to give
a nd and Bri y, though always very
U ave descrip the Net, No. 166,
be eat, as we omitted these Articles.

A [G]

INSTRUMENTS of HUSBANDRY.

A TABLE, containing compleat Harnesses for four Bullocks, of different Qualities, under five distinct Columns, referring by the Numbers to the respective Articles in the preceding List, viz.

	A.	B.	C.	D.	E.
Names of the ARTICLES.	No.	s. d.	No.	s. d.	No.
Four Bullock Suggons, —	180	at 1 4	180	1 2	—
* Or Four Neck Collars, —	—	—	—	—	—
Four Back-Bands and Pads, —	148	8 8	149	6 6	150 4 6
Four Belly-Bands, —	143	2 2	143	2 2	143 2 2
* Four Hame Straps, —	—	—	—	—	—
Four Pair of Pipes, —	158	3 6	158	3 6	159 2 8 <i>½</i>
Four Pair of Bullock Hames, —	94	4 4	94	4 4	94 4 4
Four Pair of Traces, —	97	10 0	97	10 0	97 8 8
One long Plough Chain, —	98	9 9	98	9 9	98 9 9
One Pair of Suspending Chains, —	100	3 6	100	3 6	100 3 6
One Set of Swings, and short Chain, —	30	12 0	30 12 0	30 12 0	30 12 0
One Set ditto, without a Chain, —	30	9 0	30 9 0	30 9 0	30 9 0
One Elastick Plough Goad, —	16 <i>½</i>	6 6	—	—	16 <i>½</i> 6 6
* Four Pair of Horse Hames, —	—	—	—	—	99 6 6

Thus four Bullocks are furnished with compleat Tackling, by which they cannot be cut or hurt, for working the four Houfe Plough, No. 9, the four Horse Harrows, No. 33, the two Seeding Ploughs, No. 15, and the two Horse Harrows, No. 34. The Columns A, B, and C, contain the Harnesses for Bullocks to work with Suggons, No. 183, and so every Article diminishes in Price, from the Column A to the Column C, both inclusive. But as it is a much better and safer Method to work Bullocks in Collars, as we do Horses, I have named them in the Column of Articles, and marked them thus *, and carried them on to two other Columns, D and E, with all the other necessary Articles, diminishing in Price, from D to E; so whatever Quality any Person would have, he is to distinguish it by the Letter, at the Head of the Column he fixes upon.

A TABLE,

A T A B L E, containing compleat Harness for three distinct Columns, referring by the Numbers to the ref

Names of the ARTICLES.		A.	B.
No.	l. s. d.	No.	l. s. d.
A Bridle for the fore Horse,	— — —	101 1 15 6	102 1 8 0
Two ditto, for the two hind Horses,	— — —	106 0 14 6	106 0 14 6
Three Neck Collars,	— — —	111 1 5 0	111 1 5 0
Two Pair of Hames, for the two fore Horses,		99 0 6 6	99 0 6 6
One Pair ditto, for the shaft Horse,	— — —	99 0 6 6	99 0 6 6
A Pair of Nossils and Tugs,	— — —	181 0 8 8	181 0 8 8
Three Hame Straps,	— — —	165 0 0 4	165 0 0 4
Two Pair of Cart Traces,	— — —	97 0 11 4½	97 0 11 4½
Two Stretchers, for the two fore Horses,		96 0 2 2	96 0 2 2
Two Pair of Trace Pipes,	— — —	157 0 5 5	157 0 5 5
Two Back-Bands, for the two fore Horses,		151 0 9 9	148 0 8 8
Two Belly-Bands, for ditto,	— — —	143 0 3 3	143 0 3 3
Two Back Cruppers,	— — —	155 0 9 9	155 0 9 9
One Cart Saddle for the Shaft Horse,		130 2 2 0	130 2 2 0
One Shaft Belly-Band, for ditto,	— — —	142 0 11 4½	140 0 7 7
One Britchen, for ditto,	— — —	145 0 14 6	145 0 14 6
Three Horse Nets,	— — —	166 — — —	— — —
One Whale-Bone Whip,	— — —	160 0 9 9	160 0 9 9

Thus I have endeavoured to range the different Qualities of Columns, so that by naming the Letter, at the Head of any one man would have. This Table will answer for two Horses in a

Horses in a Cart, of different Qualities, in six
peculiar Articles, in the preceding List, *viz.*

C.

D.

E.

F.

No.	<i>l.</i>	<i>s.</i>	<i>d.</i>												
103	1	5	0	104	0	17	4	106	0	14	6	107	0	11	4 $\frac{1}{2}$
107	0	11	4 $\frac{1}{2}$	108	0	8	0	108	0	8	0	109	0	6	0
112	0	16	3	112	0	16	3	115	0	11	4 $\frac{1}{2}$	116	0	7	6
99	0	6	6	99	0	6	6	99	0	6	6	99	0	6	6
99	0	6	6	99	0	8	1 $\frac{1}{2}$	99	0	8	1 $\frac{1}{2}$	99	0	8	1 $\frac{1}{2}$
181	0	8	8	—	—	—	—	—	—	—	—	—	—	—	—
165	0	0	4	165	0	0	4	165	0	0	4	165	0	0	4
97	0	11	4 $\frac{1}{2}$	97	0	11	4 $\frac{1}{2}$	97	0	11	4 $\frac{1}{2}$	97	0	11	4 $\frac{1}{2}$
96	0	2	2	96	0	2	2	96	0	2	2	96	0	2	2
157	0	5	5	158	0	3	6	158	0	3	6	158	0	3	6
148	0	8	8	152	0	6	6	152	0	6	6	152	0	6	6
143	0	2	2	143	0	2	2	143	0	2	2	143	0	2	2
156	0	7	7	156	0	7	7	156	0	7	7	156	0	7	7
131	1	14	1 $\frac{1}{2}$	131	1	14	1 $\frac{1}{2}$	132	1	2	9	133	0	17	4
141	0	5	5	141	0	5	5	141	0	5	5	141	0	5	5
146	0	12	0	146	0	12	0	146	0	12	0	147	0	8	6
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
160	0	9	9	160	0	9	9	160	0	9	9	—	—	—	—

Harness, for three Horses in a Cart, under distinct Column, I shall at once know the Kind any Gentle-Cart, as Tackling for one may be omitted.

The

The Nature of this Undertaking is attended with such a constant Demand for ready Money, that I hope, whoever may favour me with their Commands, will not expect any Credit, as the Nature of the Undertaking will not admit of it.

It is requested of every Person who may send any Orders by Letter, that they will please to add the Number which is annexed to the Articles in the preceding List to such Instruments as they may please to order, which will effectually prevent any Mistakes. And also, to specify whether they would have any extra Coulters or Socks to such Ploughs as may be ordered; the latter will always be necessary, when the Ploughs are to go to any great Distance, because no other Socks will fit my Ploughs but my own Pattern; the Reasons for which, see Page 9, in my Explanation of the BLOCK PLOUGH, No. 9.

N. B. It has for some Time past been made a Practice to invite my Artificers to do what is called little Jobs for other Persons, inconsiderately, I am willing to hope; because a Moment's Reflection would convince any Gentleman, that nothing can be more indecent and unreasonable, not to use a severer Term, than privately, and to the Interruption of my Business, to call away Men whom I have imported, collected and instructed at a great Expence, whom I constantly maintain, together with their Families, and who are to return to me, when the Purposes of the Persons so inviting them are served. Some recent Instances of this Kind, added to many preceding Ones, obliges me to mention it thus publickly, which I hope will so effectually prevent a repetition of it, as to render it unnecessary for me to take any further Notice of it.

T H E E N D.

T H E

I N D E X.

D.

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F I N I S.

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